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A
TREATISE
ON
THEATRES.

BY GEORGE SAUNDERS.

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MDCCXC.

TO THE

RIGHT HONOURABLE

CHARLES FRANCIS GREVILLE,

THE FOLLOWING TREATISE IS

WITH ALL RESPECT

INSCRIBED,

AS AN HUMBLE TRIBUTE TO THE DISTINGUISHED VIRTUES OF AN

AMIABLE AND ACCOMPLISHED CHARACTER,

BY HIS MOST DUTIFUL

AND DEVOTED SERVANT,

GEORGE SAUNDERS.

INTRODUCTION.

THE following Treatiſe is offered to the publick, principally with a view to forward an inquiry into the eſſentials of a good theatre—an inquiry which ſeems at this time peculiarly worthy of attention, when projects are forming for the erection of two new ones in this city. And this circumſtance, it is hoped, will ſufficiently apologize for producing an arrangement rather haſtily drawn up of deliberate and attentive obſervations on the principal theatres of Europe.

Our theatres have been held in ſo ſmall eſtimation, that authors in general, who have either written, or only made occaſional mention, of thoſe in other places, have paſſed over theſe as unworthy of notice.

When a foreigner arrives at a town, his curioſity naturally leads him in the firſt place to viſit the theatre. Here he receives his firſt impreſſions of the ſtate of the arts, of the genius and the manners of the people. To avoid the imputation of bad taſte, and to attain our own advantage and accommodation, it behoves us to be attentive to the principles of conſtructing a theatre, the conſideration of which being once taken up by the men of ſcience in this country, would enſure us not only a good theatre, but, I will venture to ſay, one ſuperior to any at preſent exiſting.

The moſt ſplendid theatres have been raiſed through the munificence of princes; and it is almoſt impoſſible, that any thing of the kind can be produced on a large, or elegant ſcale, when confined to the intereſt or the capital of adventurers. If we expect to have a magnificent building, we muſt join in a liberal contribution for effecting it; in return for which, beſides the honour and ſatisfaction of having ſo done, the ſubſcribers ſhould have a certain number of the principal boxes allotted to them, and their families. This is the caſe at Milan, where a ſmall additional ſum is paid by each ſpectator at the time of entrance. We ſhould alſo be very careful not to load the manager with a heavy rent; of the opera in particular, where the ſalaries of performers, expence of decoration, and attendance, are ſo great, as neceſſarily to deter him from producing ſuch a diſplay of elegance, as might otherwiſe be attained.

Hitherto theatres have been erected at hazard. No certain rule has been found, whereby an architect might proceed; in conſequence of which, we find a different form in almoſt every theatre, and as many different opinions as there are perſons who have written or ſpoken on the ſubject; ſome pretending that this or that form was beſt, without aſſigning any reaſons; whilſt others, indifferent to the form or to the eſſential qualities of the theatre, have confined their obſervations to it's materials, decorations, &c.

Count Algarotti is the firſt of the moderns, that has written any thing of conſequence reſpecting the theatre. In 1762 he publiſhed his Eſſay on the Opera, wherein he makes ſome very judicious remarks on the conſtruction of a theatre; but by not giving a deſign, has left it to the ingenuity of the architect to obviate the faults he mentions, and to combine the advantages.

After Algarotti's, a great number of publications appeared, which in general contain little more than arguments in favour of their different models.

But in 1781 Monſ. Noverre publiſhed, at Amſterdam, "Obſervations ſur la Conſtruction d'une nouvelle Salle de l'Opera." This work contains, beſides many judicious remarks on the theatre in general, the many practical obſervations Monſ. Noverre was enabled to make, as ballet-maſter, at different times, throughout Europe. He has expoſed the faults of ſtages in general, and pointed out their remedies; and theſe faults are inſeparable from every preſent edifice of that kind*. Upon the whole, we are much indebted to Mr. Noverre, for the lights he has thrown upon this difficult part of the theatre.

In 1782 appeared an Eſſay on Theatrical Architecture, by Monſ. Patte; which pleaſed me much, as he was the firſt who attempted to lay down ſome principle on which to proceed. His theory, however, in my opinion is deficient, his examination of theatres is partial, and ſometimes his compariſons are unfair.

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* "J'ai vu tous les théâtres de l'Italie, de l'Allemagne, de l'Angleterre & de la France. De cette quantité d'édifices, je n'en connois pas un dont les défauts ne ſurpaſſent les beautés."

But how was it poſſible to draw any juſt conclusions reſpecting theatres, whilſt the progreſs of ſound remained ſo little aſcertained? In deſigning a theatre, the firſt queſtion that naturally ariſes is, In what form does the voice expand? To me it is matter of ſurpriſe, that ſo ſimple a queſtion ſhould not have yet engaged a ſerious examination. We have many conſiderable tracts on the propagation, refraction and reflection of ſound, but on the laſt two of theſe ſubjects very inconcluſive.

It has often been remarked, by natives as well as foreigners, that the diſpoſition of our theatres* was inimical to a beautiful form. To ſurmount this difficulty has been my endeavour; and I flatter myſelf, that far from being inimical to ſuch a form, I ſhall ſhew that our arrangement is compatible with one in itſelf beautiful and moſt analogous to the good examples of the antique.

The method I practiſed, was, regardleſs of any theory, to make my obſervations in the different parts of a theatre. About ten weeks ſince, finding no plan was decided upon, either for Theatre or Opera, I began ſome experiments on the voice, and comparing the reſult of them with the obſervations I had before made, I drew the concluſions which are now offered to the public.

The ſhortneſs of the time I have been engaged in this work, together with the interference of other occupations, will I hope plead an excuſe for ſuch deficiencies as may appear in the following Treatiſe.

Feb. 17, 1790.

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* Three galleries, *i. e.* boxes and two galleries above.

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To the Binder.

Place the thirteen plates at the end.

As the names of different parts of the theatre are very unfixed in the Engliſh language, it may be thought neceſſary to compare ſuch of them as are made uſe of in this book with thoſe of other languages.

Latin	*Italian*	*Engliſh*	*French*
Theatrum	Teatro	Theatre	Salle
Orcheſtra	Platea	Pit	Parquet *ou Parterre*
- - -	Orcheſtra	Orcheſtre	Orcheſtre
- - -	Loggia	Box	Loge
- - -	- - -	Balcony	Amphithéâtre *ou Balcon*
- - -	- - -	Frontiſpiece	Avant-ſcène
Hypoſcenium	- - -	*Frontiſpiece below ſtage-floor*	- - - -
Scena	- - -	Stage	Théâtre
Pulpitum *vel Logeum*	Palco	Stage-floor	- - -
Scena	Scena	Scene	Scène
Paraſcenia	Telai	Side ſcenes	Châſſis
Proſcenium	- - -	*Open ſpace before the ſcene*	- - -
Poſtſcenium	- - -	*Parts behind the ſcene*	- -

A
TREATISE
ON
THEATRES.

CHAPTER I.

Optics and Phonics conſidered as they relate to Theatres.

OPTICS, in the extenſive acceptation of the word, include a conſiderable part of the ſcience of mixed mathematics: our enquiry will be confined to that part which relates to direct viſion.

It is an univerſal cuſtom to take the point of ſight for the ſcene painting, at the centre of the front boxes; and this, not only for the flats or end ſcene, but for the ſide ſcenes alſo, in which it is neceſſary in many inſtances to repreſent one continued line, ſuch as the ſide of a room, &c. in which caſe, the leaſt remove from the centre breaks this line, and weakens the effect of the ſcene. This demonſtrates that our painted ſcenes can be viewed to a proper advantage in one ſituation only; and that they will appear defective, in proportion as they are viewed at a diſtance from this point.

The actor is the only object, that can determine the form for viewing: whatever the ſcene may be, he will conſtantly attract our attention. Therefore, ſuppoſing his ſituation to be the centre of the ſtage front, it follows that this is the point, to which the eyes of all the ſpectators are directed. The only line, from which the rays are direct, is the ſemicircle, fig. 1, pl. 1, whoſe centre is the ſpot where the actor is ſituated as at A.

It has often been obſerved, that if we view a perſon at a greater height than an angle of 45 degrees (fig. 2, pl. 1), the features appear diſtorted and the expreſſions grimace. To diſcern well the motions of the features, we cannot be too near the actor: it is with great difficulty we comprehend them, at the diſtance of 75 feet.

Phonics or the doctrine of ſounds is particularly diſtinguiſhed from *Acouſtics* or the doctrine of hearing. Inſtead of dividing it into direct, refracted, and reflected, I ſhall, for the ſake of brevity and perſpicuity, divide Phonics into three diſtinct heads; namely, *formation of ſound*, *combination of ſounds*, and *progreſs of ſound*. I ſhall paſs over the firſt two, except where their intimate connection with the latter renders ſome mention of them unavoidable.

Sound is tranſmitted and makes its progreſs through the medium of air. The manner of it's operating on the air has long been the cauſe of much curious enquiry; the reſult of which goes no farther than to ſuppoſe it is affected by vibration, and moves in a circular undulating form, ſomewhat ſimilar to that of water, when a ſtone is thrown into it. It is well known, that if the formation of the ſound be fixed, as in the inſtance of a bell when ſtruck, it will expand equally every way, if nothing intervenes to alter its courſe, and the air in the ſphere of it's extent be of equal denſity.

But as ſound is very much influenced or altered by the bodies it meets with, and the form of it's expanſion depends much on the manner of it's being tranſmitted, it is neceſſarily our buſineſs to enquire, how it is affected by the different bodies it may meet with in it's progreſs, and more particularly, of the manner in which the human voice expands. In examining what has already been written upon theſe ſubjects, very little could be gained to our purpoſe; and this occaſioned the following experiments, which may help to give to this part of ſcience an additional degree of certainty.

CHAPTER II.

Experiments on the Voice.

IN making the following experiments my ſole point of enquiry was the progreſs of ſound, particularly of the human voice; how it is affected in the medium through which it paſſes; what aids, and what impedes it.

PROPOSITION I.

Of the Extenſion of the Voice on a Plane.

EXP. 1. Having traced a circle of 100 feet in diameter, I placed the ſpeaker in the centre*; the diſtance, therefore, was the radius of 50 feet every way, as fig. 3, pl. 1. The hearer moving on the circumference of this circle heard moſt diſtinctly when in front of the ſpeaker, not much leſs ſo on each ſide, but ſcarce at all behind.

EXP. 2. In the ſame circle, I placed the ſpeaker at 25 feet from the centre, which was 3-4ths of the diameter or 75 feet to the front, and

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* In all the following experiments, a calm day was choſen for the purpoſe, and an open plane; the poſitions of ſpeaker and hearer were alternately changed, and the notes made by each compared. A book was made uſe of for this purpoſe, as the voice was leſs liable to be altered by reading.

25 feet behind. He was heard beſt at the ſides C C, and indifferently in front and behind.

Exp. 3. On repeating theſe experiments, and changing the ſituation of the ſpeaker, I found the voice reached the circumference moſt equally when he was placed at 17 feet from the centre. I then, without regarding the circle, traced the extreme diſtance at which the voice could be diſtinctly heard every way *. The line it formed was that deſcribed by fig. 4, pl. 1; the ſituation of the ſpeaker was at A, from which point, at the diſtance of 17 feet in front, B will be the centre to part of the circle which it formed: the extent from ſpeaker to hearer will be 92 feet in front, 75 feet on each ſide, and 31 feet behind.

The difference of the form made by the voice, and that made by fixed ſound, is evidently occaſioned by the voice's being puſhed forward from the mouth; and this difference will always be in proportion to the exertion of the ſpeaker, and ſubject to very little variation.

PROP. II.

Of the Aſcenſion, Deſcenſion, and cubical Form of Sound.

I FOUND ſome difficulty in aſcertaining this: for in all the firſt opportunities which offered for trying it, the deſcenſion of the voice always exceeded the aſcenſion ſo much, as ſeemed almoſt improbable*. Theſe experiments were tried upon poles, ladders, or high buildings.

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* I always found the beſt way of comparing the difference of extenſion was by taking the extreme diſtance at which the voice could be diſtinctly heard.

Exp. 1. In a clean chimney, almoſt ſtraight, the voice aſcended 50 feet, and deſcended 60 feet; was heard equally well as at the diſtance of 70 feet on a plane: but as the floor of the room, as well as the earth, in the other inſtances, might attract the ſound downwards†, I made another experiment in St. Paul's Cathedral.

Exp. 2. The well-hole of the ſtair-caſe, which is free of any redundancy of ſound, is about 8 feet in diameter, encircled by a ſtone wall, and covered with a ſky-light. At ſome diſtance from the bottom, and near the top, were alternately placed ſpeaker and hearer; when the voice deſcending was heard at the diſtance of 80 feet, aſcending, 70 feet.

Allowing for the difference of the air's denſity at the top, and bottom, we may reaſonably conclude that could an air be found, of the ſame medium throughout, ſound would expand equally every way, and form a *perfect ſphere*; in confirmation of which I can add the trial made in a very windy, cold day, at a conſiderable height, the loweſt perſon being at ſome diſtance from the ground; when the aſcenſion and deſcenſion were ſcarcely different, and both correſponded with the diſtance on a plane.

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* It has been commonly believed to aſcend, more than deſcend, which at all events is contrary to its principle.

† I was obliged to Dr. Burney for this hint, who very kindly gave me any information I required.

PROP. III.

Does the Voice act upon a certain Quantity of Air of whatever Form to which it may be confined?

Decidedly not; for in all the trials I have made in long narrow rooms or paſſages, the proper diſtance for diſtinct hearing was nearly the ſame as in large ſquare rooms.

This muſt not be ſuppoſed to allude to long narrow tubes, which having a ſmall bore proportioned to the volley of air iſſuing from the lungs, through the mouth, will be equally affected at the end, by the diſplacing of ſo much air.

PROP. IV.

Of Skreens partially placed before the Voice, and oppoſing Angles.

Exp. 1. In an open field, which had in the middle a garden-ſeat encloſed with boards, as fig. 5, pl. 1, the ſpeaker was placed at the ſpot marked A, the hearer at the diſtance of 60 feet; no difference was perceived by the hearer till arriving at B he began to loſe ſight of A, by the interception of the angle of the garden-ſeat. From B to F, is deſcribed the line traced, wherein the ſpeaker might be heard, and which, at the ſhorteſt diſtance, was not more than 15 feet *.

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* Theſe experiments as well as moſt others were made with the hearer's eyes ſhut to prevent his being influenced by ſeeing the motion of the mouth.

Exp. 2. The ſpeaker was then placed at C, and the hearer at D; he was heard diſtinctly at the diſtance of 60 feet; better near the boards than at a diſtance from them: but when the hearer was placed at A, and the ſpeaker advanced from C towards D, he could not be heard till he arrived at E, which was about 20 feet diſtant.

Theſe and many other examinations are evident proofs of the delicate nature of the voice, and of the trifling circumſtances that will check it in it's progreſs: it is clear, that it requires a direct free paſſage. The lightneſs of air and gentle impulſions occaſioned by the voice, will account for it's not getting readily round any obſtacle; the time neceſſary for it's arrival gives opportunity for it's being deſtroyed.

PROP. V.

How Sound operates in different Airs, and how much it is affected by Currents of Air.

Exp. In two ſtacks of chimneys of the ſame form and height, and nearly ſtraight; one to the north, always without fire; the other to the ſouth, with conſtant fires; the voice was heard with fire at the diſtance of 40 feet upwards, and 50 feet downwards; without fire 50 feet upwards, and 60 feet downwards;—equal to 70 feet on a plane.

This agrees with Dr. Prieſtley's obſervation, that ſound varies only in proportion to the denſity of air *; or that the more denſe is the air, the more it favours ſound.

In the foregoing experiment, ſound was heard downwards one-fifth farther than upwards, although in deſcending, it went againſt the *current*, occaſioned by a very ſtrong fire. The ſame obſervations I have repeatedly made on very windy days, when I found no ſenſible difference, with or againſt the wind.

The reaſon is obvious. From the ſhortneſs of the diſtance to which the voice extends, the maſs of air is ſo inſtantaneouſly affected, as not to give time for a perceptible operation of the *current* †: on the contrary, great ſounds, which move a large body of air, are capable of being carried to a conſiderable diſtance by the wind, which may be obſerved in the firing of cannons, ringing of church bells, &c. where it is known to make a difference of ſome miles.

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* "The reſult of all my obſervations, as far as I could judge, was that the intenſity of ſound depends ſolely upon the denſity of the air in which it is made, and not at all upon any chemical principle in its conſtitution." Dr. Prieſtley's Exp. on Natural Philoſophy, vol. ii. page 298.

† Dr. Derham proved that ſound moves 1142 feet in a ſecond.

PROP. VI.

Of the Reflection of Sound.

THE ſuppoſition of ſound's *reflecting* has been almoſt univerſally admitted. The echo was accounted to be the effect of *reflection*, and has occaſioned many laborious tracts to be written, explaining the manner of its operating, and the forms that would produce it.

Sound is defined to be "the effect of a colliſion of bodies, and a tremulous motion conſequent thereon, communicated thence to the circumambient fluid, and propagated through it to the organs of hearing.

"To explain this, all ſenſible bodies are ſuppoſed to conſiſt of a number of ſmall and inſenſible parts, or corpuſcles, which are of the ſame nature in all bodies, and are perfectly hard, and incompreſſible.

"To apply this theory; ſtrike a bell with any hard body, and you eaſily perceive a ſenſible tremor in the ſurface, ſpreading itſelf over the whole, and that more ſenſibly as the ſhock is greater. Upon touching it in any other part, the motion and the ſound too are ſtopped. Now this is apparently a motion of the ſmall and inſenſible parts, changing their ſituations with reſpect to one another; which being ſo many, and ſo cloſely united, we cannot perceive their motions ſeparately and diſtinctly; but only a trembling, which we reckon to be the effect of the confuſion of an infinite number of little particles, cloſely joined, and moving in infinitely little lines.

"The ſonorous body having made its impreſſion on the contiguous air, that impreſſion is propagated from one particle to another, according to the laws of pneumatics.

"A few particles, for inſtance, driven from the ſurface of the body, drive their neighbouring particles into a leſs ſpace; and the medium, as it is thus rarefied in one place, becomes condenſed in the other; but the air thus compreſſed in the ſecond place, is by it's elaſticity returned back again, both to it's former place, and it's former ſtate; and the air contiguous to that is compreſſed; and the like obtains, when the air leſs compreſſed expanding itſelf, a new compreſſion is generated.

"From each agitation of the air, therefore, there ariſes a motion of the air, analogous to the motion of a wave on the ſurface of the water; which we call a *wave* or *undulation* of air."

According to this theory, ſound operates on the air, in it's fluid quality.

But in order to ſupport the theory of it's reflecting, another operation is given it, contradictory to the laſt; namely, that ſound is propagated by direct rays, and acts upon the air in it's diviſible quality. Accordingly Kircher*, and moſt that follow him, after explaining the progreſs of ſound to be undulative, go on comparing it's properties to that of light; which is clearly confuted by Sir Iſaac Newton, who ſays "a preſſure on a fluid medium, *i. e.* a motion propagated by ſuch a medium, beyond any obſtacle, which impedes any part of it's motion, cannot be propagated in right lines, but will be always inflecting and diffuſing itſelf every way, to the quieſcent medium beyond that obſtacle. The power of gravity tends downwards; but the preſſure of water ariſing from it, tends every way with an equable force, and is propagated with equal eaſe, and equal ſtrength, in curves, as in ſtraight lines. Waves, on the ſurface of the water, gliding by the extremes of any very large obſtacle, inflect and dilate themſelves, ſtill diffuſing gradually into the quieſcent water beyond that obſtacle. The waves, pulſes or vibrations of the air, wherein ſound conſiſts, are manifeſtly inflected, though not ſo conſiderably as the waves in water*; and ſounds are propagated with equal eaſe through crooked tubes and through ſtraight lines; but light was never known to move in any curve, nor to inflect itſelf ad umbram."

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* Muſurgia Univerſalis.

Several inſtances cited by Kircher contradict the theory of *reflection.*

Bortelli † in the former part of his work ſeems inclined to diſbelieve this doctrine of *reflection*; but not being able to account for the echo by any other means, allows and attempts to explain in what manner echoes are the effect of *reflection.*

Pere Merſenne, upon the ſame principle, has undertaken to give the form that ſhall produce echoes; and it is upon this, that the idea of a ſecret chamber or oval room took it's riſe. It is the property of the oval, that having found the two focuſes, A A, fig. 6, pl. 1, the rays of incidence proceeding from either of theſe focuſes will be all *reflected* to the other; and therefore if this effect is allowed to ſound, a whiſper from a perſon placed at one focus, will be heard by another perſon placed upon the oppoſite focus, at the ſame time that it would not be heard in any other part of the room. I cannot learn that this has ever been tried.

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* See experiment on Prop. IV.

† Del Suono, &c.

If we allow this effect to ſound, we muſt loſe all idea of it's acting upon the air in an undulative manner, and ſuppoſe it to proceed in an infinity of rays, the contrary of which has already been proved.

None of the remarkable inſtances of hearing a whiſper are occaſioned by this form. The gallery under the dome of St. Paul's church is circular; the gallery over the eaſt choir of Glouceſter cathedral is ſtraight; the Claudian aqueduct is ſtrait; and the priſon of Dionyſius at Syracuſa is a parabole.

In all the remarkable inſtances of hearing a whiſper, the neceſſary ſituation is at or near the wall. Were they occaſioned by *reflection*, the contrary would be the caſe: a ſpot muſt be found in which all the *reflecting* rays would be concentrated.

With reſpect to echoes, how would *reflection* occaſion a repetition three or four times, at the ſide of an Egyptian pyramid, mentioned by Plutarch? The ſame may be obſerved of the ſepulchre of Metella near Rome.

The Villa Simonetta near Milan has often been cited as an indubitable inſtance. The Jeſuits conſtructed a ſimilar edifice at or near Prague, in order to produce the ſame effects, but it did not ſucceed; nor has it yet been proved, why the like buildings in other places, do not echo; and the ſame reaſoning never has anſwered for any two places where echoes are produced *.

In all the experiments I was able to make, I could not find one inſtance that gave the leaſt ground for maintaining this theory. I generally tried long rooms with ſquare ones, but the diſtance of hearing was nearly the ſame. Thus fig. 7, pl. 1, repreſents a long narrow room; ſuppoſe the ſpeaker at A, the volley of ſound paſſing in a direct line through the middle of the room, according to this doctrine, ſhould be aided by the infinite number of *reflecting* rays, meeting together and proceeding with it.

Like the daſhing of waves againſt the ſea-ſhore, ſound may be ſuppoſed to be beat back; but this is very doubtful, firſt by reaſon of the imbecillity of air, and ſecondly becauſe all bodies greatly attract ſound, which is abſorbed or conducted by them according to the nature of their material.

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* The French Encyclopædia, after having ſummed up the reaſons, given by different authors, proceeds to ſay, "Mais il faut avoüer, que toute cette théorie eſt encore vague, et qu'il reſtera toûjours à expliquer pourquoi des lieux qui, ſuivant ces regles paroîtroient devoir faire écho, n'en font point; pourquoi d'autres en font, qui paroîtroient n'en devoir point faire, &c." And again, "La comparaiſon des lois de la réflexion du ſon avec celles de la lumière, peut être vraie juſqu'à un certain point, mais elle ne l'eſt pas ſans reſtriction, parce que le ſon ſe propage en tout ſens, à la lumière en ligne droite ſeulement."

PROP.

PROP. VII.

Of the Property of different Materials to alter and conduct Sound.

To aſcertain the progreſs of ſound in *air* it would be neceſſary to place two high and ſlender poles at a proper diſtance; from the top of which the experiments ſhould be made, the denſity of the *air* aſcertained, and the whole compared with the extenſion of ſound on a plane. From the beſt obſervations I could make, ſound extended in *air* in a degree nearly equal to it's extenſion on a plane, *i. e.* a field of turf or a meadow, which is always to be underſtood when the term plane is here made uſe of.

I did not find an opportunity of comparing the progreſs the voice made on *earth* upon any open paved ſurface, free of encloſures: but I always remarked the ſound was much depreſſed on earth, and very different from the ſound in other ſituations.

Earth may be ſuppoſed to have a twofold property with reſpect to ſound. Being very porous, it abſorbs ſound, which is counteracted by it's property of conducting ſound, and occaſions it to paſs on a plane, in an equal proportion to it's progreſs in air, unencumbered by any body.

If a ſound be ſufficiently intenſe to impreſs the *earth* in it's tremulous quality, it will be carried to a conſiderable diſtance, as when the earth is ſtruck with any thing hard, by the motion of a carriage, horſes' feet, &c.

Plaſter is proportionably better than looſe earth for conducting ſound, as it is more compact.

Clothes of every kind, particularly woollen cloths, are known, extremely to prejudice ſound: it's abſorption of ſound, may be compared to it's abſorption of water, which it greedily imbibes.

A number of people ſeated before others, as in the pit or gallery of a theatre, do conſiderably prevent the voice reaching thoſe behind; and hence it is that we hear ſo much better in the front of the galleries, or of any ſituation than behind others, though we may be nearer to the ſpeaker *. Our ſeats riſing ſo little above each other occaſion this defect, which would be remedied, could we have the ſeats to riſe their whole height above each other, as in the ancient theatres.

Paint has generally been thought unfavourable to ſound, from it's being ſo to muſical inſtruments, whoſe effects it entirely deſtroys.

Muſical inſtruments moſtly depend on the vibrative or tremulous property of the material, which a body of colour hardened in oil muſt very much alter; but we ſhould diſtinguiſh that this regards the formation of ſound which may not altogether be the caſe in the progreſs of ſound.

The whiſpering gallery at St. Paul's is entirely *painted* in oil: it will however be difficult to aſcertain what difference it may produce.

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* It is this has given occaſion to ſuppoſe ſound aſcends.

Water has been little noticed, with reſpect to it's conducting ſound; but it will be found to be of the greateſt conſequence. I had often perceived in newly-finiſhed houſes, that while they were yet damp, they produced echoes, and that the echoing abated, as they dried, which led me to make a very particular examination.

EXP. When I made the following experiment there was a trifling wind; conſequently the *water* was proportionably agitated. I choſe a quiet part of the Thames, near Chelſea Hoſpital, and with two boats tried the diſtance the voice would reach. On the *water* we could diſtinctly hear at the diſtance of 140 feet, on land at that of 76. It ſhould be obſerved, that on land no noiſe intervened; but on the river ſome noiſe was occaſioned by the flowing of the *water* againſt the boats; ſo that the difference on land and on water muſt be much more.

Watermen obſerve, that when the *water* is at a ſtand, and the weather perfectly calm, if no noiſe intervene, a whiſper may be heard acroſs the river; and that with the current it will be carried to a much greater diſtance, and vice verſa againſt the current.

Mariners well know the difference of ſound on ſea and land.

When a canal of *water* was led under the pit floor* of the theatre of Argentino, at Rome, a ſurpriſing difference was obſerved; the voice has ſince been heard at the end with particular diſtinctneſs, where it was before ſcarce diſtinguiſhable.

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* This canal is covered with a brick arch, over which there is a quantity of earth and the timber-floor.

The Villa Simonetta near Milan (ſee fig. 8, pl. 1) is entirely over arcades of *water*.

Another villa near Rouen, remarkable for it's echo, is built over ſubterraneous cavities of *water* *.

A reſervoir of *water* domed over near Stanmore has a ſtrong echo.

I do not remember ever being under the arches of a ſtone bridge, that did not echo; which is not always the caſe with ſimilar ſtructures on land.

A houſe in Lambeth Marſh, inhabited by Mr. Turtle, is very damp during winter, when it produces an echo, which abates as the houſe gets dry.

Kircher obſerves, that echoes repeat more by night than during the day: he makes the difference to be double.

Dr. Plott ſays the echo in Woodſtock Park repeated 17 times by day, and 20 by night †. And Addiſon's experiment at the Villa Simonetta was in a fog, when it produced 56 repetitions ‡.

After all theſe inſtances, I think little doubt can remain of the influence *water* has on ſound; and I conclude, that it conducts ſound more than any other body whatever.

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* "Sans avoir recours à des cavités ſoûterraines, la ſeule figure demi-circulaire de cette cour ſuffit pour rendre raiſon de toutes les variations que l'on remarque dans cet écho." French Encyclopædia.

† Nat. Hiſt. Oxford, cap. 1, p. 7.

‡ Addiſon's Trav. edit. 1718, p. 32.

Sound on *water* is particularly agreeable, ſonorous, and leaſt altered thereby.

The whiſpering gallery of St. Paul's Church is entirely of *ſtone*; the diameter is 112 feet, the circumference 352 feet; it is ſurrounded by a plain wall, 17 feet high to the firſt cornice, over which are windows, and an order of pilaſtres, ſupporting the dome, which has an aperture at the top 20 feet in diameter; the gallery is 6 feet wide, defended by an iron baluſtrade all round; there are eight doors in the circumference, which whether open, or ſhut, makes but little difference. At the oppoſite ſides a whiſper is heard as diſtinctly as when cloſe. I tried it with both perſons leaning over the railing, and found a little variation. We then placed ourſelves near each other, back to back. I readily perceived the whiſper approach me firſt from behind, and there was an interval of time before it reached me in front. I lengthened my diſtance, and found as I advanced towards the oppoſite ſide, the two ſounds became more united, and arriving there the two ſounds became quite united.

This demonſtrates the nature of echo; it is cauſed by *conduction*, and not *reflection*, as heretofore imagined. It depends on the *conductor* and the nature and form of the obſtacles it meets with. This may eaſily be conceived in the dome we have been ſpeaking of, which echoes four, five, ſix, or ſeven times, when the door is ſhut to with force. The ſound is *conducted*, firſt by the neareſt road it can find to the aperture at top, where it eſcapes by an exploſion or *reſounding*; then, taking a longer route, it makes another reſonance; and ſo continues till it becomes too weak to be heard.

Though I have applied this reaſoning to an aperture at the top of a dome, I do not mean that this is the form, neceſſary to produce an echo, or that the reſonances are created there: doubtleſs many things concur to occaſion a reſonance, and ſcarce any two inſtances are alike: but in all, the echo may be accounted for, upon the principle of the ſudden checks it may meet with at angles, &c. or ſuppoſe a dome perfectly cloſed and the conducting power great, the ſound may be led and returned to us, by different routes, which will make ſo many different echoes, as is the caſe in St. Paul's gallery.

The gallery over the eaſt choir of Glouceſter Cathedral conducts a whiſper in a manner ſomewhat ſimilar to that of St. Paul's: this is ſtraight and built of *ſtone.*

The Claudian aqueduct is ſtraight and built of *ſtone*; and the priſon of Dionyſius at Syracuſa is a parabole, and of *ſtone*; both with ſimilar effects.

Water and *ſtone* united produce the greateſt echoes. After water, *ſtone* may be reckoned the greateſt conductor of ſound. To what cauſe it may be attributed, I leave to future enquiries: I have confined myſelf in the preſent treatiſe to ſpeak of facts only as they appear.

Stone is ſonorous, but occaſions a harſh, diſagreeable tone, unfavourable to muſic.

Brick in reſpect to ſound has nearly the ſame properties as ſtone. Part of the garden-wall of the late W. Pitt, Eſq. of Kingſton in Dorſetſhire, conveys a whiſper to the diſtance of near 200 feet.

Wood is ſonorous and vibrative; of all materials it produces a tone the moſt agreeable, and melodious; and is therefore the fitteſt for muſical inſtruments.

Wood has a particular vibrative quality owing to it's elaſticity, and all muſical inſtruments made of this material are of a thickneſs proportioned to the ſuperficies of the wood and the tone they are to produce. But this property applies to the formation of ſound, and we ſhall find it not ſo applicable to conducting the voice.

Sounding-boards in theatres are proved by experience to be of no ſervice: their diſtance from the ſpeaker is too great, to be impreſſed with ſufficient force. Sounding-boards immediately over a pulpit may have the deſired effect; provided the *caſe* be made of a juſt thickneſs and according to certain principles.

I have not had an opportunity of aſcertaining the comparative power of *wood* to conduct ſound, unleſs Parma theatre be cited for an example. The obſervation I there made was that the ſound was very ſonorous and clear.

The common notion that whiſpering at one end of a long piece of timber would be heard at the other end, I found by experiment to be erroneous. A ſtick of *timber* 65 feet long being ſlightly ſtruck at one end, a ſound will be heard at the other, and the tremor be very perceptible: which is eaſily accounted for, when we conſider the number of fibres of which it is compoſed, each of which may be compared to a ſtring of catgut.

Wood is ſonorous, conductive, and produces a pleaſing tone, and is therefore the very beſt material for lining a theatre; for not abſorbing ſo much as ſome, and not conducting ſo much as others, this medium renders it peculiarly ſuitable to rooms for muſical purpoſes; the little reſonance it occaſions being rather agreeable than injurious*.

And with this I ſhall conclude my remarks on building materials; not entering into obſervations at length on materials in general, it being requiſite to my preſent purpoſe to take notice only of ſuch as are eſſential to the conſtruction of theatres.

Metals are ſonorous and vibrative, producing a harſh tone, very ſerviceable to ſome parts of muſic.

Moſt wind inſtruments are made of *metal*, which is acted upon in it's elaſtic and tremulous quality, being capable of being reduced very thin for that purpoſe. Inſtruments of this kind are ſuch as horns, trumpets, &c. Some inſtruments however depend more on the form than the material; as flutes, for example, " which may be made of different matters, as wood, *metal*, &c. whoſe parts are very different, but their particles nearly the ſame. If their lengths and bore be the ſame, there is very little ſenſible difference in their ſounds.

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* " Daily experience teacheth us, that in a box, whoſe walls are naked, the ſinger's voice is reverberated in a particular manner; it ſounds crude and harſh, and by no means flattering to the ear. The accents are quite loſt, if the box be hung with tapeſtry; whereas they are reflected full, ſonorous, and agreeable to the ear, when the boxes are only boarded; which is an obvious proof, and confirmed by experience, that the beſt lining for the interior part of a theatre is wood." Count Algarotti, on the Opera, Glaſcow edit. p. 93.

" Hearing is ſcientifically defined, a ſenſation, whereby, from a due motion impreſſed on the fibrillæ of the auditory nerve, and communicated thence to the ſenſory, the mind perceives and gets the idea of ſounds.

" A ſound, in effect, is nothing but a certain rarefaction or modulation of the external ear, paſſes through the meatus auditorius, and beats upon the membrana tympani, which moves the four little bones in the tympanum."

I have ventured thus much into *acouſtics* in order to elucidate the means, whereby ſound is aſſiſted in approaching the ear. The narrow end of the hearing-trumpet is applied to the ear, and the other end conſiderably enlarging, receives more impulſes of the vibrating air than the ſmallneſs of the ear's ſurface can. Theſe machines are made of very thin tin, whoſe tremulous property is eaſily put in action by the circumambient air: as a proof of which, let a ſpeaking or hearing trumpet be made thicker than uſual, and in proportion to the increaſe of it's thickneſs, will it loſe of it's effects.

APPLICATION.

FROM the foregoing experiments, and obſervations, the following definitions may be deduced: *Firſt*, That ſound expands equally every way. *Secondly*, That to alter the form of it's expanſion, the intervention of a body is neceſſary. *Thirdly*, That all bodies attract ſound.

Fourthly, That ſound is abſorbed, and conducted by a body, more or leſs according to the nature of the material. *Fifthly*, That in proportion to the conducting power of the material, will be the reſonance it occaſions. Which being admitted, it follows, that nothing can be depended on, in a theatre, but the *direct force of the voice*.

CHAPTER III.

Of the Form moſt advantageous to the Voice and Sight.

IT has been aſked, why have we not in our theatres made choice of the ſame form as the ancients? And the anſwer has uniformly been, Becauſe our manners differ from the ancients; becauſe in adopting the ſemicircle, we ſhould be obliged to leave too great an opening for the ſtage, &c. &c. Allowing theſe objections their due weight, we may add, that theatres had their riſe in Greece; and from Greece the Romans no doubt took the model for their own country; that their climates required a ſpacious open area, as the performances were conducted during the heat of the day, before a people unaccuſtomed to any encloſures that ſhut out the open air, and where females were not generally introduced into their public ſpectacles: but what availed all this in their forming the plan? Let us examine the Grecian theatre. The great area* was left for the dances and choruſes. But why not have continued the ranges of ſeats to the line of the ſtage? The reaſon appears to me obvious, becauſe they would not detract from the beauty and advantage of the ſemicircle. To this I will add, that in no one inſtance is their judgment more conſpicuous than in the very judicious diſtance at which they have choſen to place the actor;—a diſtance ſo exactly correſponding to the manner of expanding the voice, that to me it is matter of ſurprize it ſhould ever be deviated from. The advantage of ſight is alſo the greateſt that poſſibly could be gained in conjunction with that of hearing; and we may further ſuppoſe that, beſides preſerving the beauty of form, they did not extend the ſeats beyond the ſemicircle, by reaſon that many of the ſpectators would in that caſe be placed with their backs inclining toward the ſcene.

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* By Vitruvius called orcheſtre.

The Roman theatre varied ſo little from the Grecian, that little elſe need be ſaid, than that the area, inſtead of being appropriated to the choruſes and dances, was occupied by the ſenators and patricians; which Vitruvius ſays occaſioned the difference of their form.

In treating of modern theatres, I ſhall firſt ſpeak of thoſe that have been erected in our own country, and that of our neighbours the French, from whom it is probable we took the pattern.

In forming our firſt theatres, we certainly knew but little of favouring the voice, or if we did, we paid no attention to it, and were as careleſs with reſpect to the viſion; I am clearly of opinion we were guided by the form of the ſtage. Thus the opening gave the width, and height. Sometimes they ſpread every way like a fan, whoſe larger end was oppoſite the ſtage; and this enabled them to place the galleries without greatly elevating the ſeats. Attached to the old manner, it was but of late years, that the French varied it; and we to this day maintain the old form.

Italy ſome centuries back produced ſeveral magnificent theatres; but without adhering to the good examples of the antique. They have failed in proportion as they varied from them. Their opera however has been the general guide for ſimilar ſtructures in other parts; and they have the credit of having arrived the neareſt to perfection.

From this curſory view of theatres to the preſent time, we will proceed to enquire what is their moſt advantageous form.

It is clear from the experiments on Prop. I. Chapter II. that at 17 feet from the front of the ſpeaker will be the centre to the part of a circle formed by the expanſion of the voice; and that in every part thereof the hearers will equally participate the advantages. In order to make it as capacious as poſſible, and at the ſame time to reduce the opening of the ſtage, we will give 3-4ths of the diameter of a circle to the body of the theatre, and 1-8th more for the frontiſpiece. Thus A will be the front of the ſtage floor, B the opening of the ſcene. See fig. 9, pl. 1. This will be found to produce, at all times, an opening proportioned to the ſize of the theatre; the greater part of the ſpectators will be in face of the ſcene*; and it is a form that will contain the greateſt number, in an equal ſpace; all which properties will appear by the following compariſon with other forms. The oval, fig. 10, for example, has been ſuppoſed to give to every ſpectator an equal advantage of ſight; but thoſe ſeated at the extremity only, ſee in a direct line; and in proportion as the ſpectators recede from that point, they advance the back toward the ſcene. This is a diſadvantage attending it with reſpect to ſight: for hearing it is by no means calculated. All forms adapted to the theories of reflection, or conduction (were theſe ever ſo clearly demonſtrated), muſt be deficient. The main object we are aiming at, is to get as many within hearing as poſſible; therefore the ſpace left for the purpoſe of reflection can only be in proportion as we reduce the number of auditors. The ſquare I think preferable to the oval; it contains more in front: the ſides however are bad; particularly when much extended, obliging the ſpectator to turn his face almoſt over the ſhoulder. See fig. 11, pl. 1.

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* Monſieur Noverre, whoſe judgment in what regards the *ſpectacle* I much eſteem, ſays, "Les acteurs, dans toutes les circonſtances, ne doivent être ni trop près, ni trop éloignés du ſpectateur; l'acteur doit être comme le point central du demi-cercle, que la forme des loges décrit dans ſa totalité. Cette juſte diſtance, qui n'a jamais été obſervée dans aucun théatre, eſt indiſpenſablement néceſſaire aux charmes de l'illuſion. La ſcène eſt comme un tableau, dont on ne peut ſentir tout l'effet, que dans un certain point d'éloignement."

The horſe-ſhoe, fig. 12, pl. 1, has great merit: the front however is too far extended, in proportion to the width, being equal to a whole circle from the ſtage; and the ſtraight lines narrowing towards the ſcene have a diſagreeable aſpect, and ſome diſadvantages attending the ſides of the ſquare. In comparing theſe diſadvantages, it is neceſſary to obſerve, that our attention is conſtantly engaged by the actor; that we may be content with looking once or twice at a ſcene, but our face is always towards the actor; therefore, thoſe ſide ſeats, which approach the ſtage, look in a direct line; but as they recede from the ſtage, the angle becomes proportionably acute, and occaſions a very painful poſition of the head. The dotted lines to the centre of the ſtage, on the four examples, 10, 11, 12 and 13, clearly explain this.

What ſide ſeats are included in our deſign, are not only in this favourable ſituation, but are ſo few as not to be an object of conſideration.

It has been proved by the experiments on Prop. II. Chap. II. that in a given diſtance we hear worſe the higher we are ſituated; and as ſuch a ſituation is equally bad for viewing, it will be proper to keep down the ceiling of the theatre as low as may be, agreeably to the neceſſary accommodation and beauty of the building. It does not however appear that heightening the ceiling will in any wiſe ſenſibly affect the voice; it will in all caſes be a conductor of ſound to the upper range of ſeats, which leaves us at great liberty in that reſpect. To me, the proportioned height appears to be 3-4ths of the diameter, or the length from the ſtage to the front of the oppoſite boxes. Suppoſe the diameter of fig. 9, pl. 1, to be 60 feet, it will follow that the height ſhould be 45 feet from the level of the ſtage: which height includes all the viſual rays within the angle of 45 degrees. With regard to the ſize, it would not be adviſable to have a greater diſtance than 60 feet from the ſtage, on a level with the ſpeaker, or 70 feet to the utmoſt extent, in either theatre or opera-houſe. They are equally ſubſervient to the ſame laws of hearing and ſeeing; both of which are defective when that diſtance is exceeded. We may certainly erect very noble and magnificent theatres, and ſuch there are; but they cannot be ſaid to have any conformity to the purpoſes for which they were deſigned.

CHAPTER IV.

Of finiſhing a Theatre.

IN treating of the detail, I think it neceſſary to diſtinguiſh between our theatres for dramatic repreſentations and the opera; the requiſites and accommodations expected in each being very diſtinct, according to our uſages: I ſhall therefore commence with the theatre.

So prevalent is the force of habit, that it is at all times neceſſary for an architect to accommodate his deſigns to it; reſerving to himſelf the liberty of explaining what is and what is not to the general advantage of the edifice.

Of the Boxes.

WE have been accuſtomed to have the different ranges of boxes open, ſo that little or nothing intervenes to prevent there being one continued and plain wall at the back, and the ſame for the parapet in front. All the doors ſhould be made to ſhut cloſe and fluſh with the ſide next the theatre *. The columns, &c. in front, if neceſſary to ſupport the galleries, or different ranges above, will remain a matter of choice, whether to adopt them of the uſual proportions, or apply ſmall iron ones. The firſt will add to the beauty of the deſign, the laſt will leſs obſtruct the ſight, and the ſeparations elbow high can do little injury.

Of the Pit.

THE entrances into the pit have always been found diſagreeable and inconvenient to the audience. Some have pretended that the doors placed at a diſtance from the ſtage prejudice the voice †; but I rather imagine it has always been found neceſſary to place them near the ſtage, in order to obtain height for the entrance; for if the door is ſhut and made fluſh, what difference can it make? And if the diſturbance always there occaſioned be made the objection, it ſeems to me to be immaterial where this happens, the pit being ſo centrical that a noiſe made in any part of it will equally affect the whole houſe. The height will always be regulated by the ſtage, ſo that the audience may conveniently ſee what is paſſing.—It is neceſſary alſo to add a caution, that we do not, in imitation of ſome foreign theatres, place encloſed boxes round the pit. This is the place where they would do moſt injury: all round, as was ſaid before, ſhould be one continued plain wall to the top of the parapet of the boxes.

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* Our hearing better when the doors are ſhut, does not altogether ariſe from the ſound being thereby confined. The actor's voice by the time it reaches this diſtant part of the theatre becomes very feeble and is eaſily deſtroyed, even by a whiſper; the conſequence therefore muſt be much greater, when the doors are continually opening, and the outward noiſe admitted.

† The reaſon given in the preceding note for keeping the doors cloſe in the boxes, applies here againſt placing the pit-doors at the remoteſt diſtance from the ſtage.

Of the Galleries.

THE ſame obſervations will in general ſerve for the galleries. The receding of the upper one has always been found of utility, on account of the noiſe and clamour continually raiſed there by an Engliſh audience.

Of the Ceiling.

I CANNOT find that the form of a ceiling will operate much upon the voice. It ſhould be plain and without cavities: the apertures neceſſary for changing the air ſhould have covers to fit cloſe, and be opened only between the acts.

Of the Opera Houſe.

THE diviſions of an opera houſe vary much from thoſe of the common theatre; the latter requiring accommodations for every claſs of people, but the former more particularly for thoſe of the firſt rank, and ſo diſpoſed that they who chooſe may be divided into ſeparate companies. The French have nearly rejected the encloſures neceſſary for this purpoſe, under the idea that ſo great a number of cavities break and deſtroy the ſound. The Italians maintain this cuſtom, which indeed is inſeparable from their idea of comfort and pleaſure; and I believe we ſhall not readily give them up for the French improvements. It will be proper here to examine the advantages and diſadvantages ariſing from each of theſe diſpoſitions.

Under Prop. VII. Chap. II. we find that ſound is continued along a plain wall, and is very much aſſiſted thereby to a ſmall diſtance. A perſon therefore ſeated in front of a box, ſuppoſe at 7 feet from the back wall, will evidently derive but little advantage from his being ſituated in front; the diſadvantage then will be to the perſon ſitting behind in an encloſed box. This muſt have been well obſerved by perſons accuſtomed to theſe ſituations, and therefore need not be enlarged upon here.

To make ſome amends for the many cavities when encloſures are employed, we ſhould increaſe, as much as poſſible, the ſurfaces in front of the boxes, which include the entablature or moulding, together with the parapet above it: theſe ſhould be perfectly plain, as was remarked before;

and, inſtead of projecting balcony-like fronts, I would recommend that the diviſions between the boxes recede to ſuch a diſtance from the front as may be judged proper; and this may be and has been ſo managed as to have a good effect.—The quantity or width of the ſurface in proportion to the opening above, muſt be left to the good management of the architect, who will bear attention to the ladies; for they certainly will object to the opening, if it is ſo low as not to give free room for the head-dreſs when they ſtand up: but ample amends may here be made by heightening the parapets.

The pit here being appropriated to the firſt rank of people ſhould have more entrances to facilitate the frequent removals of this part of the company.

A well-diſpoſed gallery, I make no doubt, would turn to a good account. In general they have been ſo miſerably ſituated, as to prevent that part of the public from viſiting the opera who could not afford the firſt price.—I would propoſe an entire abolition of the upper gallery, and in it's place make the other more ſpacious and commodious. Here the voice might be very much aſſiſted, by avoiding the frequent cavities practiſed next the ceiling in order to form the upper gallery. The ceiling, whether level or coved, would by this method lead the ſound into the gallery, and render it a very deſirable ſituation; provided there were no projecting cornice at the foot of the cove, for which a painted cornice might be ſubſtituted, and it would anſwer the ſame effect.

Of the Orcheſtre.

The orcheſtre has hitherto received but little attention in England. I have obſerved in ſeveral theatres in Italy, that the effect there produced has been ſurpriſingly different from our's. Their manner of forming it is this: Under the orcheſtre is built a counter arch (ſee fig. 14, pl. 1), upon which is laid the floor, and at each end of this arch is joined a pipe, which opens underneath the ſtage. I have been informed that the effect of the orcheſtre at the Argentino at Rome was greatly augmented by raiſing it: which doubtleſs muſt have been the caſe, were it much below the ſtage before. This is a part attended with ſo little expence, that it will be well worth a manager's attention to try various methods. Rouſſeau de Geneve, in his Dictionaire de Muſique, has propoſed erecting one entirely inſulated, upon the principle of a muſical inſtrument.

Of the Frontiſpiece.

In the frontiſpiece more care is requiſite than is generally imagined; for upon this in a great meaſure depends the effect the ſcenery will have upon the ſpectators. By an attentive obſervation we ſhall find that the maſſy columns and pilaſtres, together with the many ornaments accompanying them, engage the eye from the ſcenery, and occaſion it to have a comparative littleneſs. I could not but remark in a theatre where the finiſhings were plain and continued to the ſcene, the grand effect that the ſcenery produced, particularly of the architectural kind. The great difficulty of accommodating this immenſe opening to any reaſonable idea of good architecture, muſt be obvious to every one who has viſited foreign theatres, particularly thoſe in Italy; where ſome of the greateſt reputation have large projecting conſoles reſting on the columns, to avoid the appearance of the ſeeming ponderance of the architrave and the ſoffite of the frontiſpiece, or what is generally called ſounding-board. And as under Prop. VII. Chap. II. we find the ſounding-board of no uſe, but when placed near the voice and operating as an inſtrument, by the elaſticity and ſonorous quality of the wood-caſe, the architect will be left at liberty to make it conformable to the reſt of his deſign, paying attention to the ſcenery. A diviſion is neceſſary between the theatre and the ſtage, and ſhould be ſo characteriſed as to aſſiſt the idea of there being two ſeparate and diſtinct places. I would adviſe it to be quite plain, without any ornament whatever. The boxes, which have been ſometimes continued to the ſcene, greatly leſſen the effect; but I do not think they injure the voice. The great advance of the floor of ſome ſtages into the body of the theatre is too abſurd *, I imagine, ever to be again practiſed; as

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* " As moſt people are captivated with what appears grand and magnificent, ſome were induced to reſolve on having a theatre built of an exceſſive extent, and out of all reaſon, where

as the performance is chiefly conducted on that ſpot where the entrances and exits are made; and ſhort ſcenes will not admit of the actor's advancing; beſides that all plots, which compoſe ſo great a part of dramatic repreſentation, muſt be among the machinery; and above all, moſt performers will not be at the trouble of advancing even when the beſt of opportunities offer. Rounded fronts are alſo uſeleſs; for when can an actor come to the extremity? If alone, he cannot ſtand fixed; and to march up and down the ſtage would be ridiculous; to make circular motions, would be worſe; and if he attempted to move to and fro, in a ſtraight line, he would tumble over the lamps. The ſtage front then ſhould be

where however they ſhould hear commodiouſly; which to effect, they made the ſtage whereon the actors perform, to be advanced into the parterre ſeveral feet; by that expedient, the actors were brought forward into the middle of the audience, and there was no danger then of their not being heard. But ſuch a contrivance can only pleaſe thoſe who are very eaſily ſatisfied: for who that reflects, does not ſee that ſuch a proceeding is ſubverſive of all good order and prudent regulation?

" The actors, inſtead of being ſo brought forwards, ought to be thrown back at a certain diſtance from the ſpectator's eye, and ſtand within the ſcenery of the ſtage, in order to make a part of that pleaſing illuſion for which all dramatic exhibitions are calculated. But by ſuch prepoſterous inverſion of things, the very intent of theatric repreſentation is deſtroyed; and the propoſed effect defeated, by thus detaching actors from the precincts of the decoration, and dragging them forth from the ſcenes into the midſt of the parterre; which cannot be done by them without ſhewing their ſides or turning their ſhoulders to a great part of the audience; beſides many other inconveniences: ſo that what was conceived would prove a remedy, became a very great evil." Algarotti on Op. Glaſc. edit. p. 99.

ſtraight, and project no more before the ſcene than does the frontiſpiece; and both ſhould project as little as poſſible.

Of the Manner of lighting a Theatre.

In laying out a theatre, regard ſhould be had to the manner of lighting it; of which ſeveral methods have been tried, but none have as yet reached the perfection wiſhed for. The French, to prevent the glare occaſioned by the number of candles in the manner they are placed by us, ſuſpend a large chandelier from the centre of the ceiling, which in ſome theatres is let down only between the acts: but the obſcurity this occaſions is objected to by moſt other people, and if ſuffered to remain during the performance, it interferes too much with the ſight of thoſe ſeated above. Some have ſilk ſurrounding the lights; but this does not prevent the light from offending thoſe who ſit under. Others have propoſed lights to be placed above a cornice, to be reflected by inclined reverberators fixed againſt the cove; and this might be a judicious arrangement, if the great glare of the reverberator could be ſoftened. Perhaps thin ſilk might here anſwer the purpoſe, and render the light exceedingly pleaſant and ſufficiently brilliant. Monſieur Patte has propoſed a method to light the *avant-ſcene* without that tormenting line of lamps at the front of the ſtage, which wrongs every thing it illuminates. He would have reverberators placed at the extremity of the boxes, on each ſide of the ſtage; and this has been practiſed in ſmall theatres with ſucceſs, particularly at Blenheim, and it is well worth the trying in larger ones.

Of the Material.

WOOD, being of all materials the moſt favourable to ſound, ſhould be adopted in a theatre, in preference to every other, not only in the diviſions, but the walls; and even the ceiling ſhould be lined with it: for which purpoſe recourſe muſt be had to an ingenious joiner, as by his aſſiſtance great effects may be produced in an immenſe theatre. That of Parma is ſo deciſive an inſtance that we need not go farther for proof.

In lining the ceiling and walls, care ſhould be taken to leave ſufficient room behind not to hurt the elaſtic property of the boards; they ſhould be united in the moſt artful manner, and the bearers to which they are faſtened placed at the greateſt poſſible diſtance. The parapets and other diviſions will afford a good opportunity of making them into a ſort of caſes by the double lining; and a void ſhould be managed under the pit floor, as well as over the ceiling. No carved work, projecting ornaments, modillions, dentils, &c. of any kind, ſhould have place; the painter may here exert his talents with great latitude, and make more than ample amends; and ſuch mouldings as are neceſſary in parts near the eye ſhould be perfectly plain and without breaks. The very faſhionable manner of lining the boxes with paper, and having feſtoons of ſilk and damaſk, ſhould by no means be ſuffered.

CHAPTER V.

Of the neceſſary Appendages to a Theatre; the Stage, and adjoining Parts.

THE whole of the theatre ſhould be ſurrounded by a thick wall, as well next the ſtage, as on every other part. Over the opening of the ſtage an arch may be turned, on which the wall may be continued up quite through the roof, ſo as to prevent all communication of the timbers. The paſſages communicating with the boxes ſhould all be arched, and have an eaſy acceſs to ſpacious ſtone ſtaircaſes, that would in caſe of fire enable the audience to depart without the leaſt hazard; and though it be neceſſary to confine the entrances to a few in number, yet there ought to be many large doors, hung on the outſide *, ready to be thrown open at the concluſion of the performance, and upon any ſudden alarm. Partition walls ſhould be carried quite through the roof in as many places of the building as opportunities afford; and no one would neglect to render it inſulated where it is poſſible.

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* The dreadful conſequence of doors hung on the inſide cannot be too much attended to. Thouſands have fallen a prey to the flames, through that ſingle circumſtance. When an alarm takes place, all are eager to gain the outſide, and the crowd carry the door with them, till it ſhuts; others preſſing forward, prevent it's being opened; and thus are they confined to deſtruction. The dreadful inſtance, cited by Monſieur Noverre, is too ſhocking to be repeated.

The additional parts of a theatre will always depend on the degree of magnificence, the ſum of money intended to be expended, and the different entertainments meant to be given in ſuch a place. We ſhall however confine ourſelves to thoſe we think abſolutely neceſſary to accompany a theatre.

The ſaloon, or what we generally term coffee-room, is ſo neceſſary that the managers of the preſent theatres find their account in adding one. The purpoſe of this place being for recreation and taking refreſhments, it ſhould be ſpacious and conveniently fitted up with ſeats, &c. in receſſes; with a proper ſituation for the bar. The ornaments ſhould be gay, and the whole carry with it an air of cheerfulneſs, be conveniently placed near the principal entrance, and ſo diſpoſed as not to interrupt the audience by the company's paſſing to and from it. The paſſages behind the boxes ſhould always be preſerved for their uſe only.

A waiting-room ſhould alſo be contrived on a level with the ſtreet, juſt within the paying-door, for the accommodation of thoſe attending the arrival of their carriages; and a lobby or hall opening to the ſtreet for the ſervants, &c.

Of the Stage.

THE ſtage and it's accompaniments may be regarded as a diſtinct part of the building; being for the accommodation of the ſcenery with all it's attendant machinery, actors, dancers, aſſiſtants, &c. &c.

The ſtage, no doubt, ſhould be proportioned to the ſize of the theatre. Some think regard ſhould be had to the kind of ſpectacle intended to be exhibited. For example, the opera requires much ſpace for magnificent ballets, &c.; and as it would be injudicious to build a theatre larger than the extenſion of the voice will allow, ſo on the other hand it would be wrong in a great and populous city to build one leſs. Therefore the extending or diminiſhing of the ſtage beyond a certain rule may be left to the diſcretion of the manager. I ſhall however endeavour to lay down ſome guide. In a full-ſized theatre the opening ſhould not be leſs than 35 feet nor more than 45 wide, and of a proportionable height;—the length of the ſtage will be 1 and ½ of it's breadth at the opening, leaving good paſſage room behind the uttermoſt ſcene *;—on each ſide of and between the ſcenes and the wall ample room ſhould be left for forming the different bodies of dancers, choruſes, guards, &c. in readineſs for entering on the ſtage; and on either hand beyond this a depoſitory for the ſcenes and machinery, opening by arcades to the ſtage. Thus every diſtinct ſervice will have it's allotted place.

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* "Il faut que la partie, proprement dite de la ſcêne, ne ſoit ni beaucoup plus longue, ni beaucoup plus large, ni beaucoup plus élevée que celle qui vient d'être la proie des flammes." The opera houſe at Paris, to which Monſieur Noverre here alludes, was 38 feet 3 inches wide, 34 feet high, and in length about 1 and ½ of it's breadth.

The abſolute neceſſity of ſuch an arrangement was ſo much experienced by Monſieur Noverre, that he has not heſitated to require a diſtance of 45 feet from the angle of the ſtage-opening to the exterior ſide wall; a circumſtance to be by all means attended to where practicable *.

Both above the ſcenery and below the ſtage the heights ſhould be proportionably increaſed. Inſtead of 6 or 7 feet, the height uſually given under the ſtage, I would propoſe 20 or 30. This would give

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* "Un théâtre ouvert dans ſes flancs permet au peintre-décorateur de *ſauter* des chaſſis, par la raiſon que la diſtance qui regne entr'eux et le mur, lui facilite le moyen de leur donner plus de largeur; de ſorte qu'une décoration, compoſée d'un fond et de trois chaſſis, paroîtroit plus vaſte et plus *grandioſe* que celle qui ſeroit formée de huit chaſſis étroitement reſſerrés. On ſent qu'il eſt impoſſible, dans cette dernière diſtribution, de pratiquer de beaux percés, et de beaux échappemens de vue: auſſi ſe plaint-on de la monotonie, du froid et de la ſéchereſſe qui regnent dans les décorations; elles n'offrent que des rues droites, que des allées d'arbres ou de colonnes, et le point de perſpective angulaire & pris de côté, dont les célébres *Bibiena* et *Servandoni* ſe ſont ſi heureuſement ſervis, n'a pu être adopté ſur un théâtre étranglé vers le fond, et trop reſſerré dans ſes flancs." Monſieur Noverre. Converſing with an eminent ſcene-painter on this ſubject, he obſerved to me that he conceived the advantage of fewer ſide ſcenes to be ſo great, that nothing but being confined by the ſide walls would prevent him from practiſing that method.

opportunity of much aſſiſtance to the machinery, and on either ſide the carpenters' and painters' ſhops might be placed communicating with the ſtage by trap-doors.

The green-room and wardrobe ſhould be conveniently placed, together with the dreſſing apartments for men and women, which ſhould have eaſy and ſeparate communications with thoſe two places.

CHAPTER VI.

AN EXAMINATION OF THE PRINCIPAL THEATRES.

Of Monſieur Patte's Deſign for a Theatre. Pl. 4.

IN the examination of theatres I have thought proper to commence with Monſieur Patte's deſigns, which will direct us how far we may allow his theory to prevail.

He ſets out upon the principle, *that the angle of reflection of a body which ſtrikes a ſurface that reſiſts or repulſes it, is always equal to the angle of incidence*; and ſuppoſing ſound to be ſuſceptible of this action, he proceeds to make choice of the oval, being a form which reflects all the rays from one focus to the other. He cuts off one end at about 1-4th of it's length for the ſtage-opening, which conſequently places the actor near one of the focuſes: the ſize of his theatre remains 57 feet 6 inches wide, and the ſame from the ſtage to the oppoſite extremity.

We have endeavoured to prove the principle he lays down, in Prop. VI. Chap. II. by which we at leaſt ſee how little dependance ought to be placed upon reflection; and had the principle been admitted, ſtill the effect muſt have been altered in the form proper for it, when filled with ſpectators. At the ſides the quantity of ſpace loſt, and that the moſt favourable for hearing, may be ſeen by comparing his deſign with our propoſal of a plan. Although the diſtance from the ſtage to the extreme box is greater than in our deſign for the opera houſe, yet it contains of equal-ſized boxes ſix leſs in each range; and in order to leave ſurfaces ſufficient, as he ſuppoſes, to anſwer his purpoſe, he makes but four ranges of boxes in a height that would admit of ſix of our's, ſuppoſing no gallery. His plan would give ſeventy-ſix, our's one hundred and fifty boxes.

With reſpect to ſight, it is ſtill more deficient. His own commendation of his plan is, that few ſpectators are entirely deprived of ſeeing; and we may alſo obſerve, that very few indeed ſee to any advantage; for if we take away the five central boxes, and draw lines as repreſented on the plan, pl. 4, the others make but a ſmall curve beyond thoſe lines, and may be ſaid to be ranged ſo as to form an acute angle of only twenty degrees; ſo that, excluſively of thoſe in the pit, three parts out of four of the ſpectators are diſadvantageouſly placed.

The ſtage is ſo exceedingly circumſcribed at each ſide of the ſcenery, that I cannot imagine Monſieur Patte gave that part a moment's attention.

b b, Fig. 1 and 2. Reverberators at the end of boxes to light the proſcenium, inſtead of a line of lamps at the front of the ſtage.

c c, Fig. 1 and 2. Other reverberators to light the ſcenes.

d, Fig. 2. Principal reverberator to light the theatre.

Of the Ancient Greek and Roman Theatres.

I HAVE given the figures of ancient theatres from Vitruvius, as explained by the Marcheſe Galliani; to whoſe excellent edition of that author I ſhall refer my readers, for a more particular account of the manner of deſcribing them and their ſeveral proportions.

The Roman theatre, pl. 2, fig. 1, was divided into three principal parts; namely, the proſcenium, or pulpitum, A; the orcheſtre, B; and the theatre, C. The proſcenium (by us called the ſtage) was the part deſtined for the performance; the floor was more particularly diſtinguiſhed by the term pulpitum, and was long and narrow; the ſcene conſiſted of an elegant piece of architecture, repreſenting the front of a palace; which being fixed, and Vitruvius, together with ſeveral other authors, mentioning three changes of ſcenery, it is now generally admitted that painted ſcenes were at times ſuſpended or placed before this, to which the three priſms *d*, *d*, *d*, turning round on pivots on each ſide, concur.

The orcheſtre (with us the pit) was appropriated to the uſe of the ſenators; which Vitruvius ordains ſhould not be more than five feet below the pulpitum. There were ſix entrances, *e*, *e*, to this place.

The theatre was appropriated to the public; the form a ſemicircle, and divided into three or more ſeparate parts; the firſt two, *f*, *f*, for the populace, and the third, *g*, for the women. The firſt two conſiſted of ranges of ſeats riſing their whole height above each other; which were to be not leſs than 20 nor more than 22 inches high, and not leſs than 2 feet nor more than 2 feet 6 inches broad; above which was the third part, being a corridore open towards the ſcene.

In cavities at proper intervals, under the ſeats were placed muſical vaſes, *h*, *h*, fig. 3 and 4, anſwering to the different notes in muſic, which ſtrengthened and ſpread the ſound to every part.

There were diſtributed, at proper intervals, doors and ſeparate ſtaircaſes, *i*, *i*, leading to the ſeveral departments; which by their number rendered the acceſs and departure eaſy and expeditious; and the whole was ſurrounded by ſpacious corridores, which ſerved for recreation and ſhelter from rain. The theatre was open to the ſky, except the gallery at top, which was roofed; and a cloth was ſuſpended to ſhelter them from the rays of the ſun.

The Grecian theatre, pl. 2, fig. 2, according to Vitruvius, differed but little from the Roman, except that the pulpitum receded more from the audience, thereby giving ſpace to the orcheſtre, where were exhibited the dances, &c. The pulpitum here was not to be leſs than 10 feet high. Theſe regulations, however, were not always ſtrictly obſerved; for in the theatre of Bacchus at Athens (ſee Stuart and Revett, Vol. II.) there is not room to ſuppoſe it varied from the Roman form; on the contrary many remarkable inſtances exiſt in Italy of forms which Vitruvius calls Greek.

Their performances were conducted during the day, and given gratis to the people, generally on public feſtivals; and often the ſame theatre ſerved for both the drama and exhibitions of fights of gladiators and beaſts.

Thus having ſhewn and compared what is already known of ancient theatres, I ſhall proceed to make ſome remarks thereon.

Inſtead of depreciating their taſte, I think theſe would be inſtances ſufficient to ſatisfy us of their ſuperior knowledge and abilities; and it is matter of aſtoniſhment to me that they could in ſuch an extent make their exhibition any way tolerable; that they did ſo we have the teſtimony of many authors.

Pliny mentions the ill effects the vaſes produced in his time; but it was the neceſſity of providing for ſo numerous a company of ſpectators that obliged them to have recourſe to artificial means of extending the ſound.

Although we have undoubted authority for theſe various circumſtances attending their theatres, I do not conclude that the caſe was the ſame with all; but that where circumſtances permitted they did enjoy the drama in it's utmoſt purity. For example, the largeſt theatre at Pompeii does not greatly exceed the dimenſions we ſhould admit at this day, and the ſmaller one we ſhould eſteem very moderate. In addition to theſe I may be allowed to name the remaining one at Athens; which, from it's being ſo much celebrated, we may conclude was the moſt ſplendid and the largeſt they would allow in that country. In the theatres at Pompeii I did not obſerve any of the cavities or vaſes deſcribed by Vitruvius; neither are there any in the theatre at Syracuſa, the ſeats being cut out of the ſolid rock.

If we compare the form of their plans with what is known concerning the extenſion of ſound, we ſhall find it the moſt juſt that could have been adopted. The Greeks took the form in which the voice naturally expanded, maintaining however only the ſemicircle in front of the ſpeaker. The Romans took the form in which ſound naturally expanded, and they may be defended from the circumſtance that actors do not always ſpeak facing the centre of the audience; but as the greater part of the performances is converſation between two or more actors, they cannot but turn towards the perſon they are ſuppoſed to be addreſſing themſelves to, and conſequently the additional direct force which ſound receives in a line fronting the ſpeaker is hereby loſt. This decides the utmoſt latitude we can be allowed in the forms; nor can we deviate from it without wronging ſome of the audience.

The great elevation of the ſeats riſing their whole height above each other was advantageous, commodious and beautiful; there was nothing to intercept the ſight or impede the voice *. Unfortunately our cuſtoms will not admit of ſo judicious an arrangement.

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* At Verona they have erected a ſtage, in the area of the amphitheatre, where it is uſual to perform in the ſummer evenings. When preſent at one of the repreſentations, I could not help remarking how diſtinctly I heard at the very top of the ſeats, at the diſtance in a direct line of about 160 feet. To account for this extraordinary inſtance of the extent of ſound, I ſuppoſe the ſtone ſeats (moſt of the upper ones being empty) were conductors to the voice.

Their ſtage had long been condemned by the moderns, as not affording opportunity for good ſcenic repreſentations, till the Marcheſe Galiani firſt interpreted the meaning of Vitruvius; ſince which little doubt remains of their having ſucceeded as well as ourſelves. I have already in Chap. III. given my opinion that the ſtage regulated the forms of our firſt theatres; and the ſemicircle has always been immediately objected to, as occaſioning too large an opening. The chief argument in favour of a narrow receding ſtage is, the quantity of changes we make uſe of, particularly in the pantomimes, where extent of depth perhaps is neceſſary to the many transformations; on the other hand, the numerous ſide ſcenes requiſite to fill up a depth are the greateſt impediments a machiniſt has to encounter with; at the beſt they have an unnatural appearance, and cannot be ſeen to a good effect except at one point. In this they all agree, and one of the moſt eſteemed ſceniſts informed me that to obviate this difficulty he always brought the ſcene as near the front of the ſtage as the ſubject would admit of. With reſpect to the dances and choruſes, it will remain matter of opinion whether it be better to place them performing one behind another, whereby great part are hid from the ſpectators, or to arrange them in view by means of a broad ſtage.

Throughout the ancient theatre I ſee ſo little to object to and ſo much to commend, that I could continue to dwell upon it with infinite pleaſure; nor can I too much recommend an attention to the precepts delivered by Vitruvius; for after all our reſearches we reſt juſt where he left us. Thoſe who are not inclined to reſpect the authorities of the ancients may be told, that this author has very ably treated of reſonance, reflection, &c. and has given to each the latitude it deſerved: nay more, he has converted the firſt to an utility ſo great in its effects as to excite our admiration and aſtoniſhment. I cannot but conſider architecture as particularly favoured by Providence in the preſervation of the labours of ſo great a maſter, compriſed in ſo few but comprehenſive words; how glorious the opportunity, after viewing the great works of antiquity, of being able to conſult this author for the methods by which they were produced, and to learn the grounds on which theſe reſpected ancients formed and adapted works, eſtimable even now in a ſtate of ruin! Upon ſuch occaſions I cannot help imagining myſelf in their company and charmed by their inſtruction. Why do we ſo little ſucceed in our attempts in this art? If I may be allowed to hazard an opinion, it is not from a want of having the means in our power, but becauſe we neglect their rules; we are not content with the graceful ſimplicity they inculcate, but are continually endeavouring in all we undertake to make our own poor additions conſpicuous. Of late, however, we have been rapidly approaching to the form of their plan; and I ſhall not be ſurpriſed if I live to ſee it adopted; for every thing that has been written and demonſtrated upon theatres tends to ſhew it's perfection.

Having entered upon the ſubject of ancient theatres, I thought a comparative view of ſome of their principal remains would be acceptable. Pl. 3, fig. 1, repreſents the theatre of Bacchus at Athens from Stuart and Revett; fig. 2, the theatre of Marcellus at Rome from

Deſgodetz and Serlio; fig. 3 and 4, two theatres at Pompeii: which I believe comprehend whatever variety is produced in all that we are acquainted with.

Of the Theatre of Bacchus at Athens. Pl. 3. Fig. 1.

THE theatre of Bacchus within the outer walls is 248 feet in diameter, which makes the radius or line from the centre 124 feet, the neceſſary extent of the voice: enough remains of the wall of the ſcene to trace the different parts; for it ſhould be obſerved that the Greek and Roman theatres were not always built according to the diſtinctions preſcribed by Vitruvius to each country. I believe all the inſtances we have exiſting are the reverſe to his directions. In Italy may be enumerated the theatre of Marcellus, and thoſe at Ferentum and Pompeii, according to the Grecian mode. In Greece, the theatre of Bacchus and (if I may be allowed to make the addition) that at Pola are built after what he calls the Latin manner.

Had Mr. Stuart attended to theſe circumſtances, he would have found that the theatre of Bacchus correſponded with what Vitruvius calls Roman, which is proved by tracing. For the diameter of the orcheſtre being found by the return walls of the proſcenium, four equilateral triangles are inſcribed therein *: of theſe triangles that ſide, *a*, which is neareſt the ſcene determines the ſame †, and leaves juſt room enough from the wall for the thickneſs of the columns and other architectural decorations. The ſtairs, *b*, led to the lower ranges of ſeats, and would have been rendered uſeleſs had the pulpitum projected as he ſuppoſes; and thus a ſemidiameter is left for the ſeats, being a form from which it does not appear they ever deviated. *c* is a door immediately over *b*, which led to the upper ranges and corridore from the ſtairs *d d*. The pulpitum I ſuppoſe to have projected as far as the ſide walls; and this accounts for the outer wall being continued beyond the ſemidiameter, and accommodates this plan in ſome meaſure to their uſages, by confining the pulpitum and adding to the orcheſtre ‡.

The plan of this theatre is thus clearly explained, without having recourſe to Mr. Stuart's improbable conjectures; of which, as they come from a man of ſuch accuracy, and are contained in a work of ſo great eſtimation, I think it my duty to take ſome notice, and eſpecially becauſe they tend to perplex, inſtead of elucidating, this part of Vitruvius.

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* In eaque quatuor ſcribantur trigona paribus lateribus et intervallis; quæ extremam lineam circinationis tangant. Vitr. lib. v. cap. 6.

† Ex his trigonis, cujus latus fuerit proximum ſcenæ, ea regione, qua præcidit curvaturam circinationis, ibi finiatur ſcenæ frons. Vitr. lib. v. cap. 6.

‡ Ideoque apud eos tragici et comici actores in ſcena peragunt: reliqui autem artifices ſuas per orcheſtram præſtant actiones. Vitr. lib. v. cap. 8.

Nec tamen in omnibus theatris ſymmetriæ ad omnes rationes et effectus poſſunt reſpondere, ſed oportet architectum animadvertere, quibus proportionibus neceſſe ſit ſequi ſymmetriam, et quibus rationibus ad loci naturam aut magnitudinem operis debeat temperari. Vitr. lib. v. cap. 7.

Mr. Stuart commences with laying down the plan of this theatre according to the Grecian proportions (ſee fig. 5. pl. 3.), and having found the centre deſcribes a circle, whoſe radius is the diſtance of that centre from the wall of the ſcene: but he ſays nothing to vindicate ſo ſmall an orcheſtre, although Vitruvius poſitively tells us the Greeks formed their orcheſtre much larger than the Romans, by reaſon that great part of the performance was exhibited there. Thus much ſerving Mr. Stuart's purpoſe, he chooſes to fly from his text, or at leaſt to doubt the explanation offered by M. Galiani, as producing in his circle a pulpitum ſcarce wide enough for a man to walk on. His own words are, "I am perſuaded the pulpitum or logeum projected at leaſt as far as to the centre; for I cannot imagine that the actors were confined to the narrow ſpace aſſigned by this ſcheme to the proſcenium, or, in other words, that the pulpitum and proſcenium were, as Galiani has imagined, only different names for the ſame place." He proceeds to cite Pollux, as enumerating the ſeveral parts of a theatre by ſeparate and diſtinct names. "He ſpecifies," ſays he, "the orcheſtre, the logeum, the proſcenium, the paraſcenia, &c. as different and diſtinct places." Now all this is decided by attending to the literal meaning of the words. The orcheſtre is ſufficiently underſtood to be the ſpace left below and in front of the ſeats of the theatre; the logeum or pulpitum[*], the floor whereon the drama was conducted. Proſcenium is the word whereon Mr. Stuart has reſted his conjecture; nor do I think Galiani has ſufficiently explained it, perhaps not chooſing to multiply unneceſſary diſtinctions, which Vitruvius has carefully avoided.

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[*] Pulpitum, quod λογειον appellant. Vitr. lib. v. cap. 8.

Proſcenium or the open ſpace before the ſcene is oppoſed to poſtſcenium or the parts behind the ſame. Thus Vitruvius when he begins to ſpeak of this place carefully explains it—"linea ducatur, quæ disjungat proſcenii pulpitum et orcheſtræ regionem *." Lib. 5, cap. 6, and repeats it afterwards indifferently by the name of either proſcenium or pulpitum. Again "per centrumque orcheſtræ proſcenii regione parallelos linea deſcribitur †," &c. Lib. 5, cap. 8, which will readily account for theſe two names, pulpitum and proſcenium, being ſo often made uſe of by ancient authors to deſcribe the ſame place: nor does Pollux give the leaſt reaſon to vary this explanation.

Paraſcenia ‡ I ſuppoſe to mean the oppoſite or ſide ſcenes. I am at a loſs to imagine how Mr. Stuart could ſay he was perſuaded the pulpitum of the Grecian theatre was meant to be projected as far as the centre, after ſo many and explicit directions by Vitruvius to the contrary. The difficulties he has brought himſelf into in maintaining his ſcheme are obſervable throughout the chapter, and have occaſioned three abſurdities,

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[*] Let a line be drawn, which may divide the pulpitum (or floor) of the proſcenium and the diſtrict of the orcheſtre.

[†] Through the centre of the orcheſtre a parallel line is drawn oppoſite to the proſcenium.

[‡] Παρα, par, a pair, oppoſite—Σκηνη, ſcena, ſcene.

which he could not explain away; namely a ſmall orcheſtre, an extremely narrow pulpitum, and part of the ſpectators hid under it.

e, *e*, ſhould be doors Mr. Stuart has neglected to deſcribe in his plan, which may be ſeen in his view; and without which the oppoſite ſtairs would be uſeleſs.

Of the Theatre of Marcellus at Rome. Pl. 3. Fig. 2.

THE theatre of Marcellus was within the outer walls about 384 feet in diameter; it's radius is 192 feet, to which if we add 96 feet for the receding of the ſtage, the neceſſary extent of the voice ſo as to be heard in every part will be 288 feet. It would contain 13,824 perſons, commodiouſly ſeated, allowing 4 feet to each; and is the largeſt theatre of which we have any remains*. As it is of a Grecian form, I have continued the line of the orcheſtre to a whole circle, to ſhew how nearly my deſign for a theatre correſponds with the ancient Greek. According to our diviſion, *a* will be the ſtage-front, *b* the opening of the ſcene.

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* I am inclined to believe this theatre had no pulpitum, and that the performances were recited in the orcheſtre, and that it ſerved at times for other exhibitions, ſuch as gladiators, wild beaſts, &c. In all the deſcriptions we have of it, nothing like a pulpitum appears.

Of the Theatres at Pompeii.

PLATE 3, fig. 3, repreſents the largeſt theatre at Pompeii; it's diameter is about 150 feet, and it's greateſt extent in a line from the centre of the pulpitum 90 feet.

a, *a*, are ſteps leading from the pulpitum down to the orcheſtre.

b, *b*, are doors leading from the porticoes into the corridore at the top of the theatre, the porticoes being on the higher ground.

c, *c*, *c*, are other entrances.

Ib. fig. 4, repreſents the little theatre at Pompeii; the ſemicircle is interrupted by the ſide walls, which leave it about 82 feet wide, and the greateſt length in a line from the centre of the pulpitum is 58 feet. Both theſe theatres have the pulpitum receding from the audience beyond the centre of the ſemicircle, after the Grecian manner: they are nearly alike, and have the fronts of the pulpitum or proſcenium decorated with niches, &c.

a, *a*, are ſteps leading from the pulpitum down to the orcheſtre.

b, *b*, *b*, entrances.

c, *c*, ſtaircaſes.

I have given the plan of theſe theatres with the whole of this very intereſting part of Pompeii, containing beſides them the ſoldiers' barracks, the forum, uniting with its porticoes for the gymnaſtic exerciſes, temples of Iſis, &c. for which ſee the reference on the plate.

Of the Olympic Theatre at Vicenza. Pl. 5. Fig. 1.

THIS theatre was begun by Andrea Palladio, May 23, 1580; was deſigned in imitation of the antique, for the Olympic academy; and ſcarce raiſed pedeſtal high, when death deprived the world of this artiſt, which happened in the Auguſt following. Scilla Palladio, his ſon, was choſen to finiſh the building.

The form of the theatre is a ſemi-oval placed lengthways towards the ſtage. The great diameter is 113 feet; the radius or half diameter, *i. e.* from the ſtage front to the outer wall, 49 feet. It is divided in imitation of the antique, and, as in them, the ſeats riſe their whole height above each other. The whole is terminated at top by a magnificent colonnade, open at the corners to two ſtaircaſes; and niches are placed between the other columns.

The ſcene conſiſts of a ſplendid piece of architecture, ornamented with numerous ſtatues, &c. with three principal doors in front and two at the ſides, through which are ſeen ſeven ſtreets built in perſpective; and the whole is covered with a ceiling framed of wood, 46 feet high from the ſtage.

In defence of Palladio it muſt be ſaid, much has been learnt reſpecting the ancient theatre ſince his time; and that he could have derived but little advantage from modern works of that kind. Widening the ſemicircle towards the ſtage was injudicious for the purpoſe of hearing, being directly oppoſite to the form which the voice naturally takes; and to this alſo the colonnade open at the corners to the ſtaircaſes together with ſo many niches and ſtatues was prejudicial: but for ſight it had it's advantages, (if we do not ſuppoſe it too narrow,) nearly all the ſpectators being placed in face of the ſcene *.

The ſcenery is defective, not only as not admitting of any change, but being in itſelf bad: to ſee a number of ſtreets through doorways leading into a palace, inſtead of the internal parts of the building, is ridiculous and againſt all probability. But in this Palladio bore no ſhare; the records ſay, Scamozzi gave the deſigns for the ſtreets.

This theatre has been rarely uſed of late years.

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* I muſt caution the public againſt a very unfair obſervation made by Monſieur Patte. "Néanmoins on n'a pu éviter un nombre de places de ſouffrance vers l'extrémité des gradins, à la rencontre des murs de ſéparation de la ſcène et de l'orcheſtre; inconvénient au ſurplus qui eſt commune au Théâtre antique, et auquel il n'eſt gueres poſſible d'obvier, à moins de donner une largeur exceſſive à l'ouverture de la ſcène, ou à moins de laiſſer ces places vacantes." It was occaſioned by the receding of the ſeats and not by the form of their plan; and although a few were prevented from ſeeing to the extremity of the ſcene, yet were they not prevented from ſeeing the actor. M. Patte ſhould have added, that he was deſigning a theatre in which the ſpectators were to be ſeated perpendicularly over each other; and that the front of the boxes would anſwer to the outer line of the ancient orcheſtre, in which caſe the ſemicircle and ſemi-oval would have an advantage no other form can pretend to. On the other hand I could eaſily prove that his form is the very worſt that could poſſibly be conceived for receding ſeats, or galleries; ſo neceſſary we ſee it is to regulate our judgment by compariſon.

Of the Theatre at Parma. Pl. 5. Fig. 2.

THIS theatre was erected ſoon after that at Vicenza. It is not known who was the deſigner, but Bernini is ſaid to have finiſhed it. It has not been played in ſince the court was removed from hence, and is ſuffered to remain in a very ruinous ſtate. It is ſituated on the firſt floor of the ducal palace.

The theatre is 130 feet long from the front of the ſtage to the back of the gallery above the ſeats, and 102 feet wide: of a very different form from that of the theatre at Vicenza; this being an oblong, rounded off at the end oppoſite the ſtage. It's diviſions are nevertheleſs ſimilar. The ſeats riſe their whole height above each other, and are terminated by a magnificent corridore, like Palladio's Baſilica at Vicenza; which together with the reſt of the decorations gives room to ſuppoſe ſome one of his pupils was the architect. Between the ends of the ſeats and the ſtage is a conſiderable ſpace, decorated on either ſide ſomewhat like a triumphal arch with an equeſtrian ſtatue over each; from which we may conclude it was erected with a view to grand proceſſions, &c. The interior part is wholly compoſed of wood; the ceiling is contrived of boards perfectly level and ſmooth.

The ſtage has no *proſcenium*; the opening is very ſmall in proportion to the theatre; being only 38 feet 6 inches ſquare; the frontiſpiece is profuſely ornamented with maſſy columns, over which is an attic;

between the columns are two heights of niches, each ſurrounded by ſmall columns, entablature, &c.

This theatre is univerſally cited as an admirable inſtance of the conveyance of ſound; the truth of which I can teſtify, having converſed in a low voice from the ſtage to the oppoſite extremity. I found but little difference by retiring 10 or 12 feet on the ſtage; but beyond that, the voice perceptibly varied: ſo that the proper diſtance between the ſpeaker and hearer was 140 feet. This extraordinary circumſtance is generally allowed to be occaſioned by the material with which it is lined. The boards are not placed horizontally, as ſome have imagined to be neceſſary for this purpoſe; but nearly all againſt the walls are perpendicular. Some indeed object that theſe advantages are not real; and that were the theatre filled with ſpectators the abſorbing materials of the clothes, bodies, &c. would deſtroy the effect. I can only anſwer that this theatre was played in ſo long as the court remained at Parma to maintain it; that had it been defective, that character could not have failed being ſomewhere mentioned; inſtead of which we ever find the ſame uniform account of it's effects.

Of the Theatre of San Carlo at Naples. Pl. 6. Fig. 1.

THIS theatre is the largeſt now played in, being 70 feet long from the ſtage-opening to the front of the oppoſite boxes, 70 feet wide between the ſame, and 70 feet from the pit to the ceiling. It's form is a ſemicircle whoſe ſides are prolonged, narrowing towards the ſtage, ſomewhat ſimilar to a horſe-ſhoe. It contains 6 ranges of boxes, 29 in each range, ſeparated to their whole height by partitions: in the ſecond row, oppoſite the ſtage, is placed the King's box.

The ſtage has no *proſcenium*; the opening is 53 feet ſquare, and the floor advances in a circular line: behind the ſtage is a large door with ſteps, for introducing horſes on particular occaſions.

It is the faſhion in Italy to receive viſitors in the boxes, to play at cards, and often to ſup there; this doubtleſs firſt gave occaſion for encloſed boxes, which from thence were adopted in other countries.

The form of this theatre is a favourite one with the Italians; but it will be found on examination to extend in length conſiderably beyond what it ought. For example, the radius of the ſemicircle is 35 feet, to which add 17 for the increaſed direct force of ſound, when thrown from the mouth, and 52 feet will be the length from the ſtage proportioned to a breadth of 70 feet. This by experience is found to be the caſe; for here you cannot diſtinctly hear at the end, though very well at the ſides *. Upon the whole this theatre is too large, and may ſerve to caution us not to extend our plan beyond the probable reach of the voice.

Of the Theatre of Argentina at Rome. Pl. 6. Fig. 2.

THE form of this theatre is ſomewhat like that of Naples, a little lengthened in proportion; it is 60 feet from the ſtage-opening to the front of the oppoſite boxes, 53 feet wide between the ſame, and 46 feet high from the floor of the pit to the ceiling. There are in appearance 6 ranges of boxes, 31 in each range; conſequently very ſmall and low, and partitioned to their whole height:—the upper range are moſtly windows.

Like the preceding one, the ſtage has no *proſcenium*, but the floor advances in an irregular line: the opening is 41 feet 6 inches.

Although Monſieur Patte has thought proper to condemn this theatre, yet the univerſal eſteem in which it is held will lead us to a more particular examination; and in conformity to the maxim we have laid down, not to proceed upon mere ſpeculative opinions, we ſhall relate facts as they have been, and are proved to exiſt.

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* "Je me rappelle que quoique je ne fuſſe pas à l'extrémité du parquet, j'avois néanmoins de la peine à diſtinguer la plupart des voix." Monſieur Patte.

Formerly it was obſerved, that the actor was heard conſiderably better at the ſides than at the end of this theatre; till, there being occaſion to lead the water that way, a canal was made under the pit in a line from the centre of the ſtage, which ſo aided the voice in that direction that the actor is now heard equally well in every part.

At this time the encloſure of the orcheſtre was as high as the ſtage, which being inconvenient for the ſpectators ſeated in the pit was lowered conſiderably; but this being found to prejudice the ſound it was again raiſed ſo high as to allow the muſicians' heads to be above the ſtage, and the ſucceſs of this alteration was beyond what they had conceived.

If we compare theſe circumſtances with the known operations of ſound, we find the length to be 17 feet too much in proportion to the breadth of 53 feet; which correſponds with the former obſervations made in this theatre.

Theſe different effects of the orcheſtre will ſhew that it ought not to be too much ſunk, but on the contrary elevated as much as conveniently may be. This will be againſt the ſentiments of thoſe who favour reflection; for according to that principle, when the orcheſtre is low and the ſtage conſiderably higher than the encloſure, the body of ſound would be more confined to the theatre, and the reflection from the ſide under the ſtage ſhould add to it's ſtrength. Theſe effects alſo prove that ſound acts with greater force where it has room to expand every way, or at leaſt that any confinements at the ſides or back will not aſſiſt it.

Of the Theatre at Bologna. Pl. 7. Fig. 1.

THIS theatre is 66 feet in length from the front of the ſtage-floor to the front of the oppoſite box, and 12 feet more to the ſcene; 57 feet wide between the boxes; and 63 feet 6 inches high from the pit-floor to the ceiling. The ſtage-opening is 51 feet wide, ornamented with four maſſy columns upon which reſt large conſoles ſupporting the ſofite. There are 5 ranges of boxes, 25 in each range, beſides thoſe in the *proſcenium*; all built of brick and ſtone, with columns placed in front of the four loweſt ranges, and arcades between the columns of the firſt two. The pit is ſurrounded by two rows of ſeats; the upper one defended by a baluſtrade.

Bibiena the famous ſtage-decorator is by ſome ſaid to have been the architect; by others the work has been attributed to Galli, his ſon. If we regard this theatre merely for viewing the ſcenic repreſentations, we muſt allow that the form is happily adapted for that purpoſe; which certainly was the intent of the deſigner, and will always be the caſe where the manager of any particular department is employed to lay out a building of this kind: his whole attention will naturally turn toward his own occupation, and the form will be regulated accordingly. If we except the advantage it has for viewing the ſcenery, few theatres rank in a lower degree of eſtimation than this. The length is immenſe in proportion to its breadth, and may be ſaid to be too much by 30 feet.

The exceſſive number of it's columns, arches and baluſtres, contribute greatly to injure the ſound, and the material of which it is built renders it particularly harſh and diſagreeable; and this latter circumſtance ſerves to ſhew that however much we may wiſh to have the internal parts of a theatre proof againſt fire, this cannot be attained without preventing at the ſame time the very enjoyment for which it is erected.

Of the Theatre of San Benedetto in Venice. Pl. 7. Fig. 2.

THIS is aptly called the Bottle Theatre, to which it bears a reſemblance in the plan. It is given here rather as a curioſity, than for any thing we can learn from it. A ſight of the plan will be ſufficient to ſhew what an abſurdity exiſts in the world.

Of the Theatre at Imola. Pl. 7. Fig. 3.

THIS theatre was lately built by Cavalier Morelli. It is very ſmall, being only 38 feet long from the ſtage-floor to the oppoſite boxes; 42 feet wide between the boxes; and 42 feet high. The ſtage-opening is 42 feet wide. There are 4 ranges of boxes, 17 in each range. The form of that part which is properly ſtyled the theatre is barely $\frac{2}{3}$ of an oval; but the ceiling is continued over the ſtage to complete the oval, where it is ſupported by four caryatides, which make three apertures upon the ſtage. A view of this diſtribution is given on plate 8.

A ſmall theatre like the one under conſideration, requires, perhaps, a ſtage large in proportion to the other parts, to avoid a ſeeming littleneſs in the decorations; for we ſhall find that habit entirely regulates our ideas of greatneſs. Indeed a large ſtage-opening is not only applicable in all inſtances, but is far more magnificent, capable of greater variations, and ſubject to very little more expence, than our common ſcenery.

I ſuppoſe the ſcene-director is inclined to allow a ſtage-opening of the required extent; in which caſe I ſhould immediately adopt the ſemicircle for the form of my theatre, and continue the ceiling over the ſtage to complete a whole circle, with apertures for drop-ſcenes. The columns or caryatides, as they are at Imola, upon the ſtage, ſhould be moveable or calculated to receive ſcenes before them: which would give opportunity as on this ſtage of having three diſtinct ſtreets leading towards the theatre; whereby the abſurdity of different perſons being at the ſame time on the ſame ſpot and not hearing or ſeeing each other would be done away: the illuſion would have it's full force, and there would be room for far ſuperior decorations than any we have been accuſtomed to. If it is wiſhed that the ſcene be more confined, which I will ſuppoſe to be generally the caſe, the apertures on the ſides may be filled each by a ſingle ſcene, and only the central aperture left open: and this alſo will have a better effect than our preſent ſide-ſcenes. For the performance of a grand ballet the columns may be removed, and a ſpace will then be obtained ſufficient for any ſubject, with opportunity for diſpoſing the dancers in the moſt advantageous point of view. In the intervals of theatrical repreſentations, the whole circle may be exhibited; and it may alſo be appropriated to a grand fête, being capable of the moſt uniform and elegant adjuſtment. With regard to the expence of this diſtribution, it gives room or ſpace, which is often wanted, for the moſt magnificent ſcenery, where coſt is the leaſt object; and in common caſes a ſingle flat ſcene may be employed at a ſmall diſtance in the central aperture, with two ſcenes to cloſe thoſe on the ſides. This will be more elegant and natural, and attended with no greater, nay perhaps leſs expence than the preſent method.

Let this arrangement once take place, and we ſhall immediately become poſſeſſed of a perfect theatre, of a form the only one that completes the illuſion of the ſtage; a form the moſt agreeable in itſelf, exhibiting the whole company at every point of view, and the moſt advantageous for both hearing and ſeeing.

Of the Theatre at Milan. Pl. 7. Fig. 4.

THE form of this theatre is that of an egg cut off at the ſmall end; it is 71 feet 6 inches in length from the ſtage-floor to the oppoſite boxes, and 17 feet more to the ſcene; 66 feet wide in the broadeſt part between the boxes, and 69 feet high from the pit-floor to the ceiling. The ſtage-opening is 43 feet wide; there are 6 ranges of boxes, 39 in each range, ſeparated by partitions to their whole height, beſides 8 in the proſcenium; in all 239, allowing the ſpace of three for the entrance into the pit. Each box is 5 feet wide, 6 feet deep, and 9 feet high; moſt of which have private rooms on the oppoſite ſide of the corridore for the attendance of ſervants with refreſhments, ſupper, &c. and the corridores are all 6 feet wide. The greater part of theſe boxes are private property, and a ſmall additional price is paid at every time of admiſſion to ſee the performance. Within the ſame building are included complete ranges of apartments for recreation, cards, and taking refreſhments; one ſet for the nobility and another ſet for the *bourgeoiſie*. Ample ſtair-caſes conduct to every part, and every accommodation is furniſhed for rendering this place fit for aſſemblies upon all occaſions.

The theatre, like that of Naples, is conſiderably too large: the actor is heard with great difficulty, though better than at Naples, which I think is owing to the judicious manner of fitting it up. The whole of the internal part is of wood; the parapets of the box-fronts are maintained of a good height, and are perfectly plain and even. The encloſures which divide the boxes recede a ſmall diſtance from the front, which is the method I would prefer to that of projecting the fronts in curved lines, as it would give a very ſuperior advantage with reſpect to both ſight and ſound.

In this theatre we may learn what is the effect of ſound with the greateſt aids it can receive in it's progreſs: and with all theſe aſſiſtants we find that this ſpace is conſiderably too large, and that a certain dimenſion ought not to be exceeded. In proportion to it's width this theatre will be found to be too long by 21 feet, agreeably to the form in which the voice expands.

Of the Theatre at Turin. Pl. 6. Fig. 3.

THIS theatre is attached to the king of Sardinia's palace, and has the ſtage-floor nearly level with his apartments. The form is an oval cut off at one end and ſpread at the ſtage-opening.

The length from the ſtage to the front of the oppoſite boxes is 61 feet, the breadth 52. The height is 53 feet from the floor of the pit to the higheſt part of the ceiling; which latter riſes about 5 feet, making in it's breadth the portion of a circle whoſe centre is nearly in the middle of the pit. It is compoſed of boards perfectly ſmooth, lined with cloth, and ornamented with paintings in oil: a void is managed above on the principle of muſical inſtruments. There are 6 ranges of boxes, at the average of 29 in every range; each box is 6 feet wide and 6 feet 11 inches high: the king's box is placed in front of the ſcene, nearly on a level with the ſtage.

Under the orcheſtre there is a reverſed arch, with a pipe at each extremity, terminating and opening underneath the ſtage.

The frontiſpiece is highly ornamented with 4 maſſy columns, with boxes between them, and in the ſofite is the aperture, by which they let down a large chandelier before and after the performance, contrary to the practice in theſe countries, where it is uſually ſuſpended in the middle of the ceiling. The ſtage advances in a circular line; the

opening

opening is 42 feet 6 inches wide, and it is 112 feet long, beſides a court behind, by which they occaſionally lengthen the ſcenery.

This theatre is conveniently approached by ſpacious porticos, of which there are three; one for foot paſſengers and chairs, another for the paſſage of carriages, and the third for carriages in waiting: theſe lead to many ample ſtair-caſes, &c.

I have been particular in deſcribing the different parts, becauſe no pains were ſpared to render this the moſt perfect edifice of it's kind by the Count Alfieri.

The obſervation I made was in the pit, and I found that, ſimilar to others, the voice was heard proportionably better at the ſides than at the end fronting the ſtage. At Turin it is generally ſaid to be too large, that is, too long; for we hear remarkably well at the ſides as we approach the ſtage; and the length will be found to be 19 feet too much in proportion to it's breadth. Great pains were taken to aſſiſt the ſound by the form and material; but they have failed in the form, and it was injudicious to paint the ceiling on a lining of cloth.

Of the Theatre at Bourdeaux. Pl. 6. Fig. 4.

ALL perſons acquainted with the theatre at Bourdeaux, are unanimous in their deciſion in it's favour. They all agree that the voice of the actor ſpreads more equally in this than in any other theatre. The figure, reckoning at the front of the amphitheatre, is nearly equal to it's whole circle; but the wall is cut off at about one fifth of the diameter for the ſtage-opening. It is decorated with 12 columns of the whole height from the amphitheatre to the arches under the ceiling, between which the upper ranges of boxes are managed. It's great diameter is 64 feet, and between the boxes it is 53 feet wide; from the ſtage-front to the oppoſite boxes, 47 feet. The ſtage-opening is about 40 feet. Great care has been had to uſe none but the moſt beneficial materials for the inſide: the ceiling is painted in freſco, and the whole moſt elegantly adorned.

The ſmallneſs of it's ſize is much in it's favour, which renders it difficult to make a compariſon. The form is regulated thus. Within the greater circle a ſquare is inſcribed, three ſides of which are given to the theatre, and the fourth is left open for the ſtage. My plan would bring forward the ſtage nearly as far as the line dividing the orcheſtre and pit, thereby avoiding thoſe ſide boxes which incline their backs towards the ſtage. The almoſt inſulated columns are bad; and the disjoining of the boxes by them, and placing of ſo many arches at the top, takes away much of the acknowledged benefit of ſmooth and unbroken ſurfaces.

Of the Théâtre Italien at Paris. Pl. 9. Fig. 1.

THE form of this theatre is three fourths of an oval: it is 58 feet long from the ſtage-front to the oppoſite wall, and 48 feet wide between the walls.

If the architect meant to follow Monſieur Patte's principle, he has adopted the worſt part in chooſing this form, and has neglected in every other inſtance the good advice that author gives. He has ſeparated the boxes by the moſt ill-formed partitions, which projecting a little from the wall are ſo many checks to the ſound. This theatre is univerſally condemned, and is a diſgrace to that poliſhed nation.

I need not here repeat my arguments reſpecting the too great length of the theatre; but ſhall leave them to be applied by thoſe who have the leaſt acquaintance with this building.

Of the Théâtre François, now de la Nation, at Paris. Pl. 9. Fig. 2.

THIS building is inſulated, but communicates by two bridges with houſes on either ſide. It is ſurrounded on three ſides by open ſpacious corridores and a portico of eight columns in front. The plan ſhews one half of the theatre taken at the height of the firſt floor of the boxes and balcony, all the reſt at the level of the pit-floor.

The theatre (or ſalle) within the walls is 64 feet wide, 58 feet 6 inches long from the front of the ſtage-floor, and 52 feet high from the floor of the pit to the centre of the ceiling. The ſtage-opening is 42 feet 6 inches wide. The form is that of two ſemicircles whoſe diameters are oppoſed to each other at the diſtance of 6 feet; the intermediate ſpace being bounded at each end by a ſtraight line. The ſtage-floor advances into the theatre, in a curved line, to the diſtance of about 11 feet from the end of the ſemicircle neareſt the ſcene. There are four ranges of boxes, excluſive of thoſe in the arches; part of the upper range is occupied by the gallery; and a little above the level of the ſtage a balcony projects over the pit. From the firſt floor of the boxes 12 pilaſters riſe to the whole height, ſupporting a domed ceiling, which is interſected by groined arches.

This theatre is held in great eſtimation for the equal force with which the voice reaches every part of it; and had it been executed agreeably to the original plan *, I do not heſitate to ſay it would have been ſtill nearer perfection. Although it is faulty in many reſpects, yet the advantages reſulting from it's proximity to the form, in which the voice expands, particularly deſerve our attention.

According to the experiments on Prop. I. Chap. II. this theatre is about 9 feet too long in proportion to it's width; which I believe will be found to be the caſe upon an accurate obſervation in the theatre. The advantages it poſſeſſes can ariſe only from the direct force of the voice, for in almoſt every other inſtance it is far from aiding the voice: for example, the pilaſters project conſiderably before the walls, there are many arches in the ceiling, a balcony projects over the pit, and a range of encloſed boxes ſurround the ſame.

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* The original deſign, as projected by Meſſ. de Wailly & Peyre, architects du Roi, was a circle into which the ſtage advanced nearly one third of the diameter.

Of the late Opera Houſe in London. Pl. 10. Fig. 1.

"SIR John Vanbrugh had intereſt enough to raiſe a ſubſcription of thirty perſons of quality, at 100l. each, for building a ſtately theatre in the Haymarket: on the firſt ſtone that was laid of this theatre were inſcribed the words Little Whig, as a compliment to a celebrated beauty, the toaſt and pride of that party. The houſe being finiſhed in 1706, it was put by Mr. Betterton and his aſſociates under the management of Sir John Vanbrugh and Mr. Congreve, in hopes of retrieving their deſperate fortunes; but their expectations were too ſanguine. The proſpects of the theatre being unpromiſing, Mr. Congreve gave up his ſhare and intereſt wholly to Vanbrugh *."

This theatre underwent ſeveral alterations †, the principal of which was in 1782, when it was enlarged under the direction of Mr. Novoſielſki. The form was then made an oblong rounded off at the end oppoſite the ſtage. The length was, from the ſtage-front to the oppoſite boxes, about 58 feet, and 23 feet more to the ſcene; the breadth between the boxes 43 feet; and the height 44 feet from the centre of the pit to the ceiling. There were three ranges of boxes, 34 in each range, beſides 18 in a line with the gallery; in all 116, allowing the ſpace of two for entrances into the pit. Each box was from 5 to 6 feet wide, from 7 to 7 feet 6 inches high, and 6 feet deep. Thoſe in the firſt range being on a level with the ſtage, had their fronts continued in one even line to the central box; but all the ranges above, as alſo the firſt gallery, projected in curved lines over the pit. A ſecond gallery was managed in the cove of the ceiling, which was groined for that purpoſe. Five entrances led into the theatre; three from the Haymarket, and two from Market-lane.

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* See Biographical Dictionary, ed. 1784, art. Vanbrugh.

† "At the firſt opening it, the flat ceiling that is now over the orcheſtre, was then a ſemi-oval arch, that ſprung fifteen feet higher from above the cornice. The ceiling over the pit too was ſtill more raiſed, being one level line from the higheſt back part of the upper gallery to the front of the ſtage; the front boxes were a continued ſemicircle to the bare walls of the houſe on each ſide. This extraordinary and ſuperfluous ſpace occaſioned ſuch an undulation from the voice of every actor, that generally what they ſaid ſounded like the gabbling of ſo many people in the lofty aiſles in a cathedral. The tone of a trumpet, or the ſwell of an eunuch's holding note, 'tis true, might be ſweetened by it; but the articulate ſounds of a ſpeaking voice were drowned by the hollow reverberations of one word under another." Cibber's Apology.

Being confined to the original walls, Mr. Novoſielſki had not the opportunity of giving it a greater width; the form therefore remained extremely bad, and the ſtage and it's appendages wretchedly confined and inconvenient. But I will deſiſt from particulariſing theſe defects which were unavoidable, and ſpeak of ſuch as in my opinion might have been avoided.

The only aſſiſtance ſound can have to reach the end of a long, confined ſpace, is plain and ſmooth ſurfaces to conduct it: inſtead of which, the line of the box-fronts in this theatre was continually broken by the projecting curves, and theſe covered with paper ornaments, which were liberally diſtributed in every part of the theatre. The firſt gallery was low and inconvenient, and very little could be either diſcerned or heard there by thoſe who were ſituated behind. The ſecond gallery by being next to the ceiling was the beſt ſituation in the houſe for hearing, but very prejudicial to every other part. And thus that which was of neceſſity bad was rendered ſtill worſe, by adopting almoſt every means in the finiſhings, that could oppoſe the progreſs of ſound.

Of the Theatre in Covent Garden. Pl. 10.

Fig. 2. is the plan taken at the level of the front boxes.

Fig. 3. the plan at the level of the firſt gallery.

THIS theatre is 86 feet long from the ſtage-opening to the oppoſite wall at the end of the gallery, and 56 feet wide between the walls; 31 feet 6 inches high from the ſtage-floor to the ceiling, which ſlopes upwards to make room for the upper gallery. The form of the area between the box and gallery fronts is an oblong, 36 feet 6 inches from the front of the ſtage-floor, and 56 feet from the ſcene to the oppoſite boxes, and 38 feet 6 inches wide between the boxes. The front boxes are 18 feet deep from the front to the back, the firſt gallery 30 feet 6 inches, and the ſecond gallery 21 feet 6 inches. I will firſt take notice of the inconveniences theatres are ſubjected to, when built of this form, and then examine the preſent one in particular.

If the ſides of a ſquare be ill adapted for viewing, as repreſented on pl. 1. fig. 11. the ſides of an oblong muſt be proportionably worſe: it is impoſſible to view the actor from the diſtant end of the ſide boxes without great pain, and even then he muſt be ſeen very imperfectly, and thoſe ſeated behind cannot ſee at all. But the diſtance occaſioned by this form is not the only defect; a conſiderable one ariſes from the great depth of the front boxes and two galleries over them. The fronts being low, neceſſarily obſtruct the ſound: the little that enters is preſently attracted and abſorbed by the perſons, clothes, &c. of the ſpectators in the foremoſt rows*; the continual reſpiration of ſo great a concourſe of people in this confined ſituation, together with the lights, ſoon renders the air unfit for the purpoſe of conveying ſound; the air loſing it's elaſtic property becomes extremely unwholeſome, and any remedy applied to thoſe particular parts by the partial introduction of cold air would be productive of bad conſequences. If it be neceſſary to have apertures to renew the air, they ſhould be general; or where one only is uſed it ought to be ſituated ſo as equally to affect the whole theatre.

Perſons of rank and private parties are obliged to reſort to the ſide boxes in order to avoid being incommoded by the much complained of admiſſion of all characters into the front boxes; but here they loſe the advantage of ſight, beſides being obliged to a diſtortion of the body in turning towards the actor; or if, to avoid theſe inconveniences, they make choice of the ſtage-box, the line of lamps before their eyes is equally offenſive. I believe it is univerſally agreed that the pit is the only good ſituation in our preſent theatres.

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* This obſervation I have often made in the firſt gallery, where the difference of hearing before the upper gallery and under it was very apparent.

Covent Garden theatre has been built about 60 years; during which time it has not undergone any material alteration, except in the decorations, till the year 1784, when it was judiciouſly widened under the direction of Mr. Richards, who was confined to the preſent walls, and therefore could not extend it as he wiſhed. This therefore with reſpect to it's form remains with all the defects uſual in Engliſh theatres.

Mr. Richards would have acted judiciouſly had he introduced more painted ornaments in lieu of projecting ones, which as a ſcene-painter I am rather ſurpriſed he did not. For example, the parapets of the gallery-fronts and upper boxes, which afforded opportunities for plain ſurfaces, are filled in with ſolid baluſters; the others are divided into panels and tablets, with carved ornaments in the friezes; pilaſters are placed at the ſides of the gallery without the leaſt apparent neceſſity, and the like all round the lower range of boxes, with decorative arches over; and all the partitions are lined with paper, and feſtoons of drapery hang in front *; than which nothing can be more injurious to the progreſs of ſound.

The public ſhould not ſubmit to be crowded into ſuch narrow ſeats: 1 foot 9 inches is the whole ſpace here allowed for ſeat and void;

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* This I imagine to have been done to hide an architectural defect, the floor of the upper ranges being below the architrave of the under range.

though a moderate-ſized perſon cannot conveniently ſit in a leſs ſpace than that of 1 foot 10 inches from back to front, nor comfortably in leſs than that of 2 feet.

The frontiſpiece is ſuch an one as no architect would have applied. Were a painted frame to be propoſed for a picture, how would a connoiſſeur exclaim! The ſcene is the picture, and the frontiſpiece, or in other words the frame, ſhould contraſt the picture, and thereby add to the illuſion. The great advance of the ſtage-floor was made with a view to obviate the great difficulty of hearing in this theatre; but the little ſervice of ſuch remedies I truſt is ſufficiently demonſtrated in Chap. IV. The ſtage is very much confined, and therefore ſubjected to thoſe inconveniences ſo ably ſet forth by Monſieur Noverre in his "Obſervations ſur la Conſtruction d'une nouvelle Salle de l'Opera."

The original form of this theatre was ſimilar to the preſent theatre in Drury-lane, and is repreſented by the dotted lines, fig. 3.

CHAPTER VII.

Deſcription of a Deſign for a Theatre. Pl. 11 and 12.

PLATE 11 repreſents the plans—fig. 1 at the level of the ſtage-floor—fig. 2 the principal entrance; being under the coffee-room.

Plate 12 contains two ſections—fig. 1 from *a* to *b*, fig. 2 from *c* to *d* on the plan.

Theſe deſigns exhibit only the internal parts of the theatre, being confined to the principles of conſtruction, diſtribution, and accommodation. The decorations are purpoſely avoided in order to preſerve our attention entire to the other objects. The external parts muſt always be made applicable to the ſituation.

Agreeable to the principle laid down in Chap. II. and III. *that the direct force of the voice only can be depended on in a theatre*, this is planned upon the exact form in which the voice expands. The diameter within the line of the covered boxes is 60 feet; the diſtance from the ſtage-floor to the oppoſite central box is 45 feet: therefore 30 feet being the radius or ſemidiameter, 15 feet are left for the additional force of the voice in a right line from the ſtage-front; and as 17 feet is proved to be the proportioned diſtance for throwing the voice into a ſemicircle, this plan leaves 2 feet upon the ſtage which is generally the actor's ſituation, as at *x*. The height from the ſtage-floor to the ceiling is 45 feet, and

the

the gallery being below it and receding from the ſtage, brings all the ſpectators in front within an angle of 36 degrees. In this plan very few can be ſaid to be ſeated ſideways to the ſtage; all within the ſemicircle, which contains full four fifths of the company, are ſeated in front, beſides thoſe in the pit.

To obviate the objection that our boxes in general are not deſirable ſituations for hearing, a balcony is here projected before the boxes, poſſeſſing more advantages than will be found in the pit, being more elevated and ſtill near to the actor; ſo that the whole of the audience would be within a very moderate diſtance of hearing, and throughout the advantages are nearly equal. The firſt gallery projects only 8 feet over the boxes, and the upper gallery but 9 feet over the other. Thus the evil of confined and deep cavities is prevented, and a free circulation of air muſt be the conſequence, which is ſo very neceſſary to the conveyance of ſound and regard for health.

This plan affords an opportunity of placing the orcheſtre in a centrical ſituation, and thereby preventing the predominancy of ſome inſtruments above others, and rendering the muſic more united and harmonious. Under the orcheſtre a reverſed arch is managed, in a method ſimilar to the Italian.

The ſtage-opening is 38 feet 6 inches wide; the front of the ſtage-floor is preſerved ſtraight, which together with the frontiſpiece projects 7 feet 6 inches before the ſcene. The actor will conſequently have very little advance to make, and will appear (as he certainly ſhould do) among the ſcenery.

An advantage this form poſſeſſes over every other, reſpecting the number of ſpectators it will contain, I ſhall prove by comparing it with Covent Garden theatre. In this deſigned theatre every ſpectator would be well accommodated, and the different ranges of boxes and galleries maintained of a ſpacious height. A perſon ſeated in the moſt remote part from the ſcene, would be 15 feet nearer the ſcene than a perſon ſo ſituated in Covent Garden theatre*. And yet,

	In Covent Garden theatre.	In the deſigned theatre.
The upper gallery will contain	384 perſons	525
Firſt gallery and ſlips	700	927
Boxes	729	600
Pit	357	368

And were the number of ſeats in this deſign increaſed by reducing their width from 2 feet to 1 foot 9 inches, which is the ſize of thoſe in Covent Garden theatre, this would afford room for exceeding the nightly receipts of that houſe by 40 pounds.

The preſent deſign exhibits a form the moſt analogous to the *antique* that it is poſſible for our arrangements to permit †: a ſpectator ſeated in any part of this theatre would have the additional gratification of ſeeing the greater part of the company arranged in the moſt beautiful line; a line which the ancients conſtantly maintained in their theatres.

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* That the compariſon ſhould be taken from the front of the ſcene, I think is ſufficiently demonſtrated in Chap. IV. See "Frontiſpiece."

† By inſcribing a triangle within the circle which the boxes deſcribe we ſhall find that one ſide will be the line of the ſtage-floor, anſwering to the Roman ſcene: or by inſcribing a ſquare within the ſame circle, our ſcene will be found nearly anſwering to the Greek. The difference on the plan is that our ſeats are continued beyond the ſemicircle.

A happy opportunity here offers for placing the king's box oppoſite the ſtage, which projecting to the front of the balcony, with a ſmall canopy over it, would be within view of nearly all the ſpectators; and the royal perſons would enjoy the exhibition in it's perfection, being ſituated at a point which unites the illuſion of the ſcenery with the advantage of hearing; a deſirable circumſtance, which in this country has never yet been attained.

The entrances into the pit will be by two doors at the corners marked *y, y:* the dotted lines ſhew the paſſages between the ſeats.

Each box will have it's ſeparate door communicating with an arched corridore, and four doors lead into the balcony, which together with three large outer doors will render the departure, in caſe of an alarm, ſafe, eaſy and expeditious.

The ſpaces marked H, H, will each contain two ſpacious ſtaircaſes, which being of ſtone and encircled by a wall will enſure the ſafety of ſpectators in the galleries.

The ſtaircaſes F, F, leading from the principal entrance will communicate with the theatre and coffee-room G, which is by this means ſituated at a convenient diſtance, ſo that the audience may not be diſturbed by thoſe who frequent that place.

K is a waiting room for the convenience of thoſe who attend the arrival of their carriages; and by it's vicinity to the hall of entrance M, is rendered very convenient for giving directions to the ſervants there in waiting.

L is the receiver's room. The paying-door being at the beginning of the paſſage I, will enable the door-keeper to prevent improper perſons from crowding the paſſages *.

The ſtage comes near the proportion deſired by Monſieur Noverre, and which perhaps he would allow to be ſufficient for our theatre. Following his advice I have planned a depoſitory at each ſide P, P, communicating with the ſtage by three arches, for the convenience of ſhifting the ſcenes and machinery; and ample room will be left for forming the bodies of choruſes, dancers, attendants, &c. The ſcene may occaſionally be lengthened by having a ſhifting partition to divide the green room and ſtage.

R, R, are dreſſing rooms for women, four ſtories high above the ſtage; S, S, the like for men; in all ſixteen, communicating by the ſtair-caſes T, T, with the green room Q and the wardrobe over it; making two ſtories above the ſtage. The wardrobe by being thus ſituated will be in the centre of the dreſſing rooms, and the clothes may be ſerved to the different perſons without carrying them about to an inconvenient diſtance.

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* The long paſſages which conduct to the different parts of our preſent theatres are productive of much miſchief. The paying-doors, inſtead of being at the outward end, are always in the contrary ſituation; thereby giving the beſt of opportunities for the depredations of pickpockets, and confining the company in a narrow ſpace without the poſſibility of relief in caſe of an accident.

Underneath the ſtage, &c. may be contrived the houſekeeper's apartments, performers' entrance, carpenter's ſhop, painter's room, &c. &c.

Deſcription of a Deſign for an Opera Houſe. Pl. 13.

FIG. 1, repreſents the plan. Fig. 2, a ſection of the theatre from *a* to *b* on the plan. Fig. 3, ditto from *c* to *d*.

Theſe deſigns are confined to the theatre and ſtage, being the principal ſubjects of this treatiſe. Reſpecting the form, &c. what has already been ſaid upon the foregoing deſign for a theatre will equally well apply to this for an opera.

This deſign is for a very ſmall opera houſe. The diameter between the boxes is 68 feet; the diſtance from the front of the ſtage-floor to the oppoſite boxes 51 feet; and the height is 51 feet from the ſtage-floor to the ceilin g The ſtage-opening is 43 feet wide, and the floor advances 8 feet 6 inches before the ſcene. There are four ranges of boxes, 25 in each range; each 6 feet wide, 7 feet 6 inches high, and 8 feet deep; in all 98, allowing the ſpace of two for the entrances into the pit. One gallery only is here propoſed, which, by being ſpacious and open, would be a deſirable ſituation; and the ceiling being perfectly even, will aſſiſt the voice in reaching thoſe diſtant parts. Each box has it's ſeparate door communicating with arched corridores

8 feet wide, leading to ſpacious ſtone ſtaircaſes; and the pit will have four entrances—two leading to the corridores, and one on each ſide of the orcheſtre. The two circular ſtaircaſes in the angles are for the gallery.

The diviſions between the different ranges of boxes, together with the parapets, are contrived without breaks, and the ſurfaces as wide as can be obtained. The gallery is entirely open, and, as I conceive, more characteriſtic; for a ceiling, or roof, in appearance ſupported by ſlender pillars, reſting one upon another to the number of 6 or 8 in height, is a very uncomely ſight.

If this plan be extended to the largeſt ſize we ought in reaſon to allow, namely to 60 feet from the ſtage-floor, and 70 feet from the ſcene to the oppoſite boxes, and theſe continued to the ſcene according to the uſual mode, it will contain 165 boxes, for 6 perſons each, in all 990; and the pit will contain 900 perſons, the gallery 927.

I cannot too much enforce what has already been ſaid reſpecting the diſtance for hearing. In moſt of the theatres extant, whoever wiſhes to have a tolerable view of the ſtage, muſt be ſituated beyond the reach of the actor's voice; but if he wiſhes to be near the ſtage, he is miſerably ſeated ſideways: ſuch is the uſual compenſation for an exceſſive ſubſcription. I am confident, that where the diſtance of 60 feet from the front of the ſtage-floor, or 70 feet from the ſcene to the oppoſite boxes, is exceeded, the actor will be heard very imperfectly; but not to reſt on my bare aſſertion, I beg leave here to ſum up the ſeveral evidences.

The theatre of Argentina at Rome is 55 feet long from the ſtage-floor, and 63 feet from the ſcene to the oppoſite boxes. The théâtre François, now de la Nation, at Paris, is 54 feet long from the ſtage-floor, and 63 feet from the ſcene to the oppoſite boxes; in both which the actor is well heard. On the contrary, the théâtre Italien at Paris is 58 feet from the ſtage-floor, and 74 feet from the ſcene to the oppoſite boxes; the theatre at Turin is 56 feet from the ſtage-floor, and 75 feet from the ſcene to the oppoſite boxes; and more than either is the theatre of San Carlo at Naples, being 64 feet from the ſtage-floor, and 78 feet from the ſcene to the oppoſite boxes; a ſize this ſo exceſſive, that it is with the greateſt difficulty the audience can diſtinguiſh any thing ſaid upon the ſtage; and the other two are proportionably bad.

CONCLUSION.

AMONG the various deſigns I had projected for theatres I conceived the two here offered to the public to be the beſt, as combining the greateſt advantages, and uniting the intereſt of the manager with that of the public. Many obſtacles, it is true, oppoſe the forming of a perfect work; but we ſhould carefully diſtinguiſh between the greater and leſs imperfections; and it is particularly the province of the architect to make the former ſubſervient to the latter.

I cannot help repeating what I before obſerved, that it is in our power to have a theatre ſuperior to any exiſting; but I deſpair of ſeeing a magnificent one erected till undertaken by a company of perſons of rank and faſhion, whoſe influence and example would ſoon produce a ſum more than equal to its charges. Late inſtances teſtify the avidity with which ſubſcriptions are entered into, although the ſpeculations of private individuals. Many ſchemes might be propoſed for this purpoſe; but that which appears to me the readieſt and moſt feaſible, is to divide the property into a number of ſhares; each ſhare to be entitled to a box in perpetuity. Suppoſe for example the theatre to contain 165 boxes, and 65 to be the number of proprietors; a ſubſcription of 1500 l. each would produce 97,500 l. and each proprietor by holding a box would poſſeſs equal to an annual intereſt of 126 l. for the 1500 l. The proprietors would have it in their power to chooſe a fit perſon for the manager, to whom the theatre might be let for ſhort terms at a peppercorn rent; the manager to keep it in repair and produce a ſtated number of exhibitions, for which there would remain the receipts for 100 boxes to be let to yearly ſubſcribers, and the receipts for admiſſion into the pit and gallery, which at a moderate computation would amount to 40,000l. annually *, beſides other contingent advantages; a ſum that would command the moſt magnificent repreſentations.

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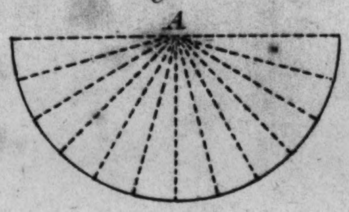
* The yearly expenditure has been uſually confined to 18,000l.

THE END.

Plate I.

Fig. 1.



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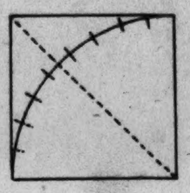

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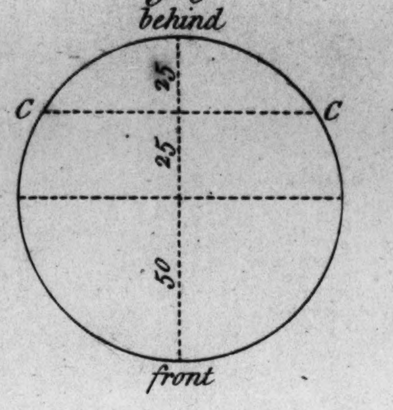

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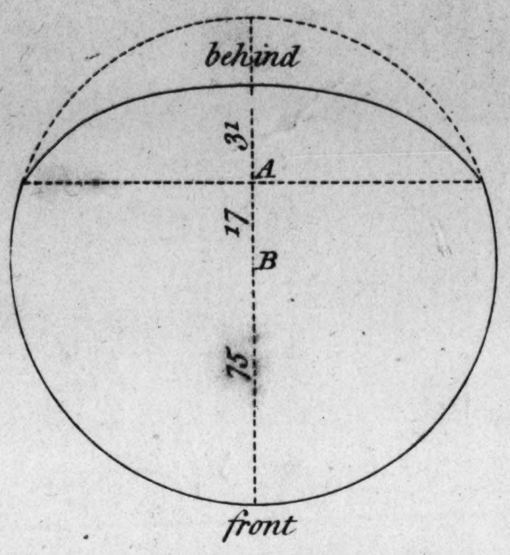


Fig. 9

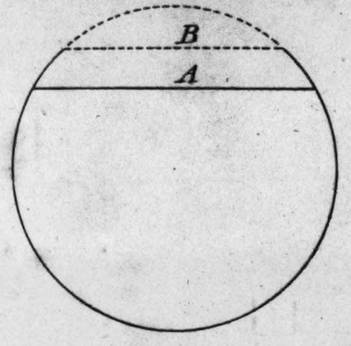


Fig. 10.

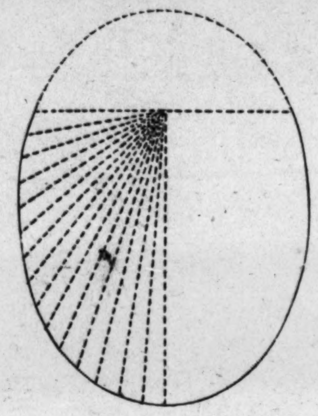


Fig. 5.

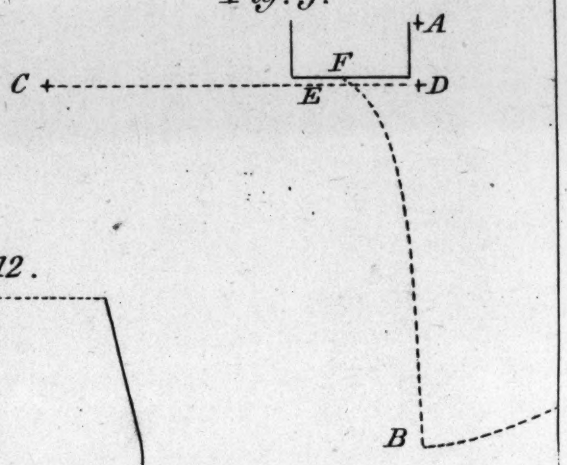
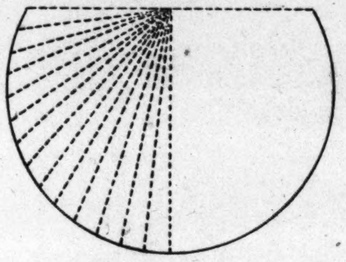


Fig. 13.



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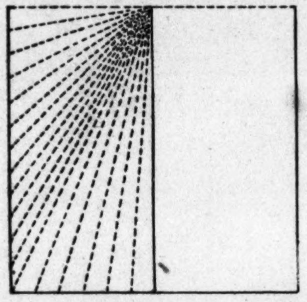

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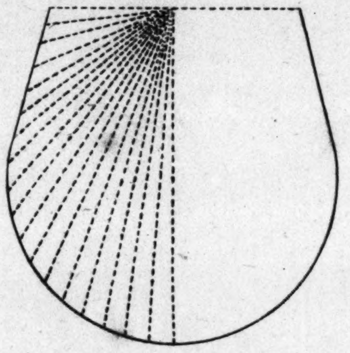

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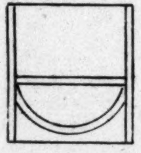

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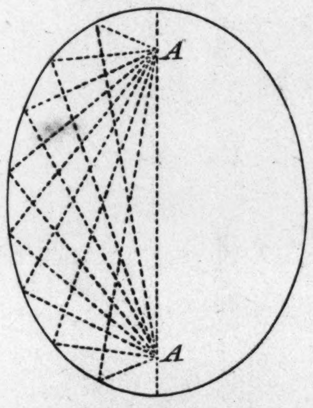

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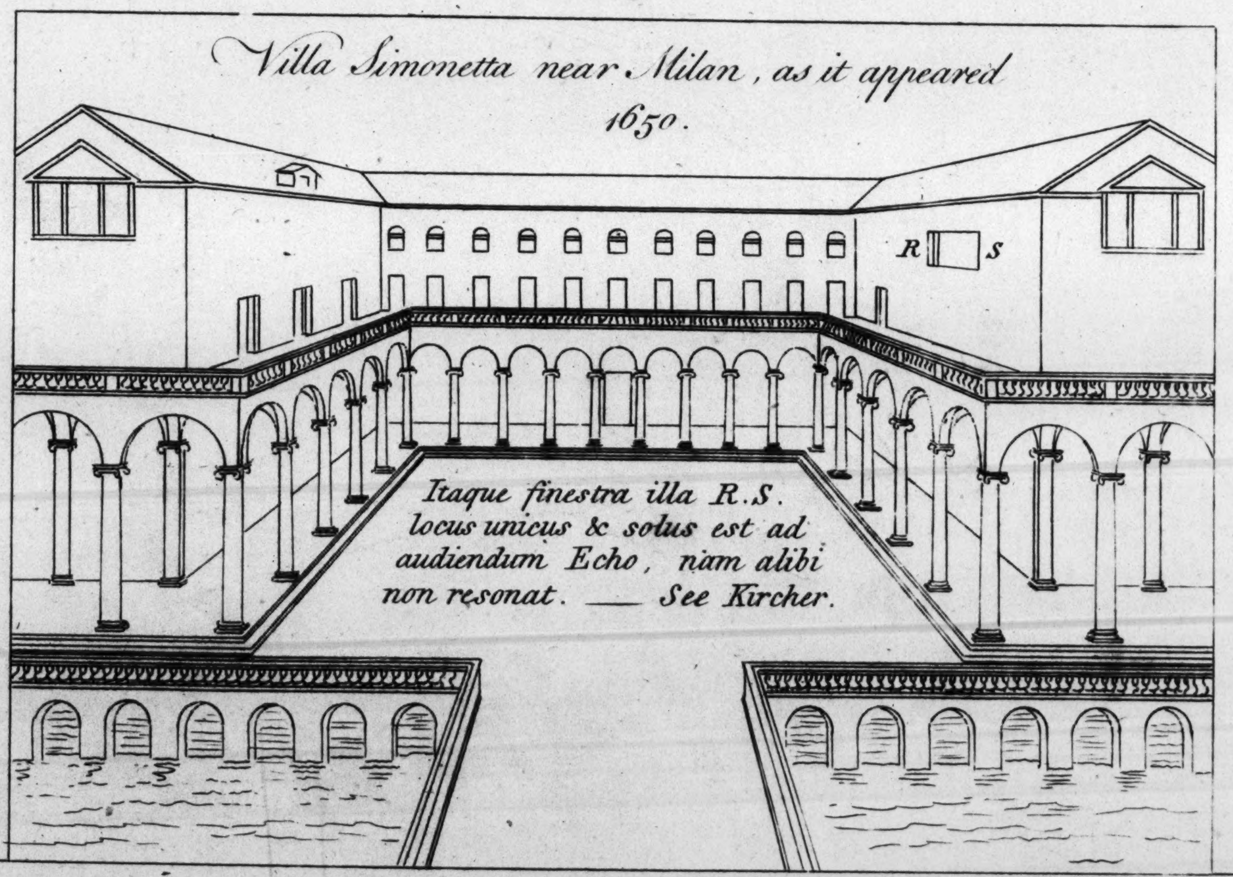


Villa Simonetta near Milan, as it appeared 1650.

Itaque finestra illa R.S.
locus unicus & solus est ad
audiendum Echo, nam alibi
non resonat. ___ See Kircher.

Fig. 7.

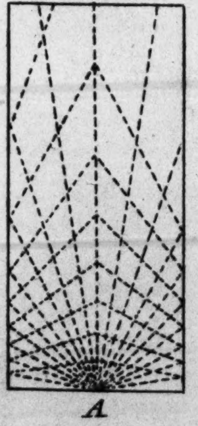


Plate II.

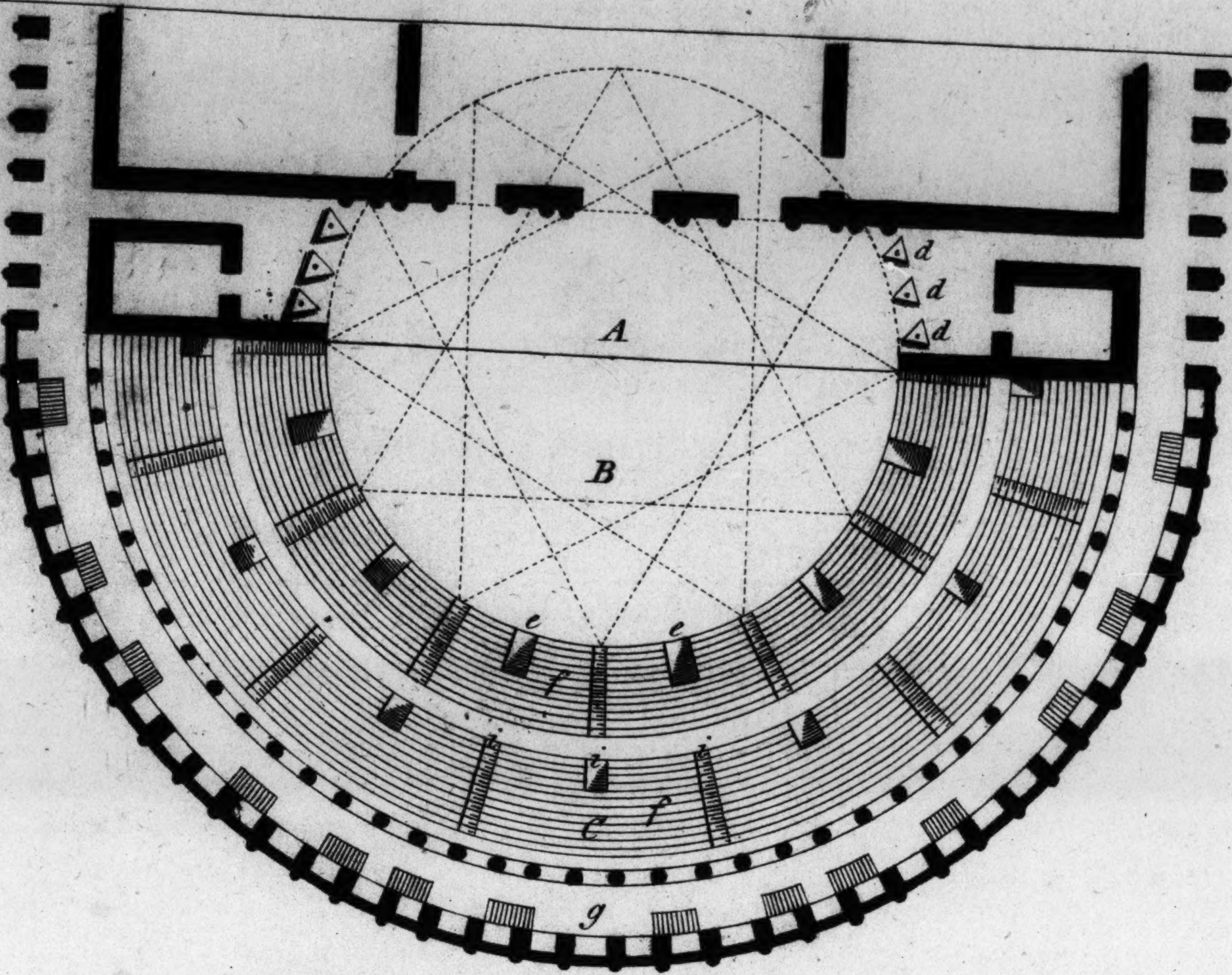
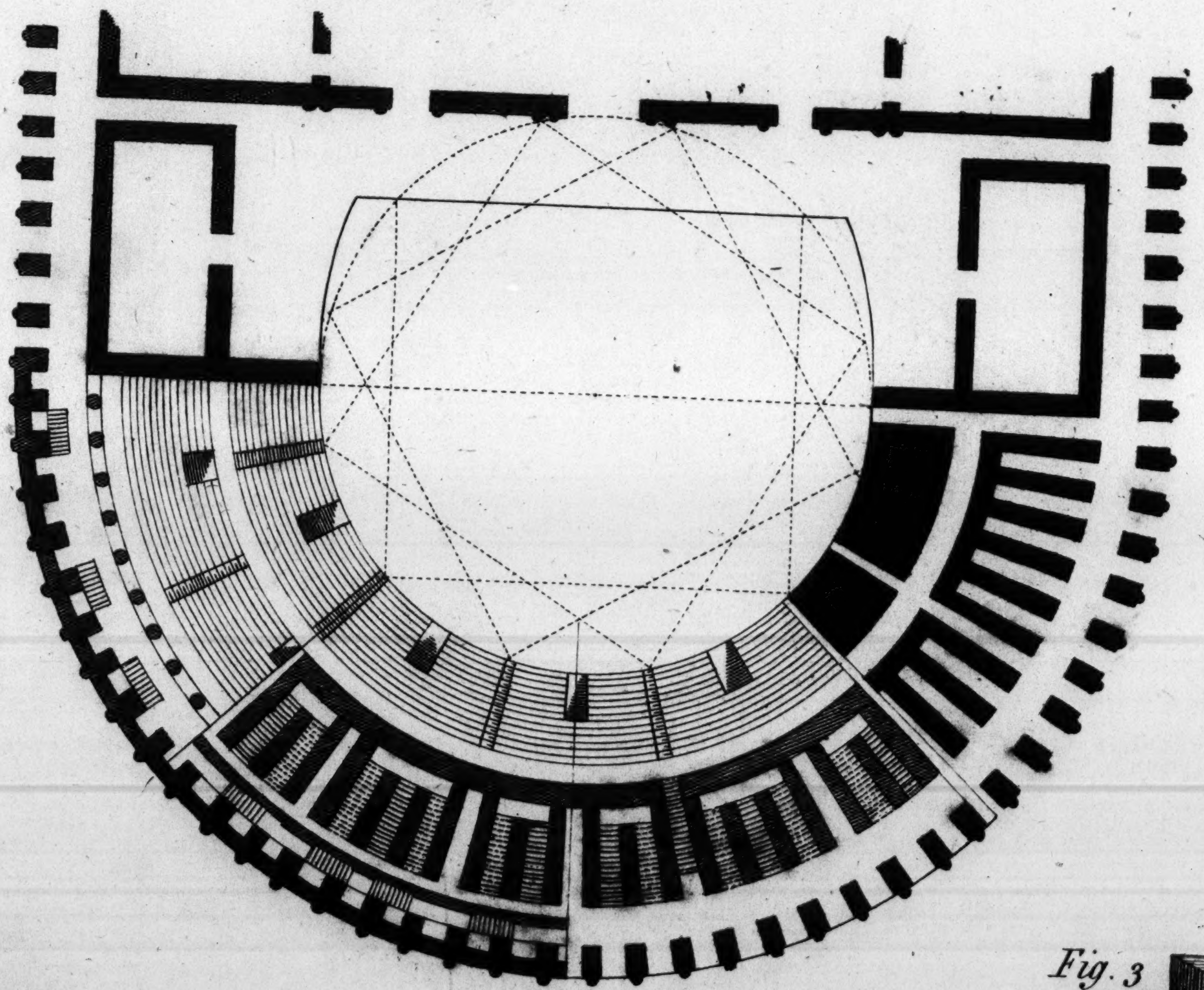


Fig 1.

Ancient Roman Theatre.

Ancient Grecian Theatre.



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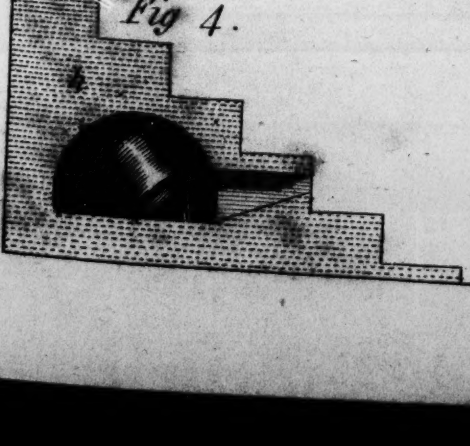

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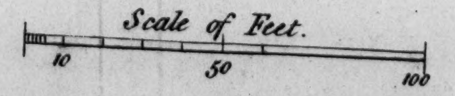


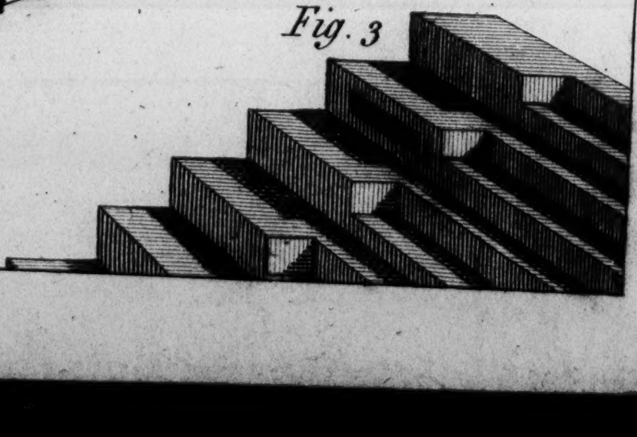


Fig. 3

Theatre of Bacchus at Athens.

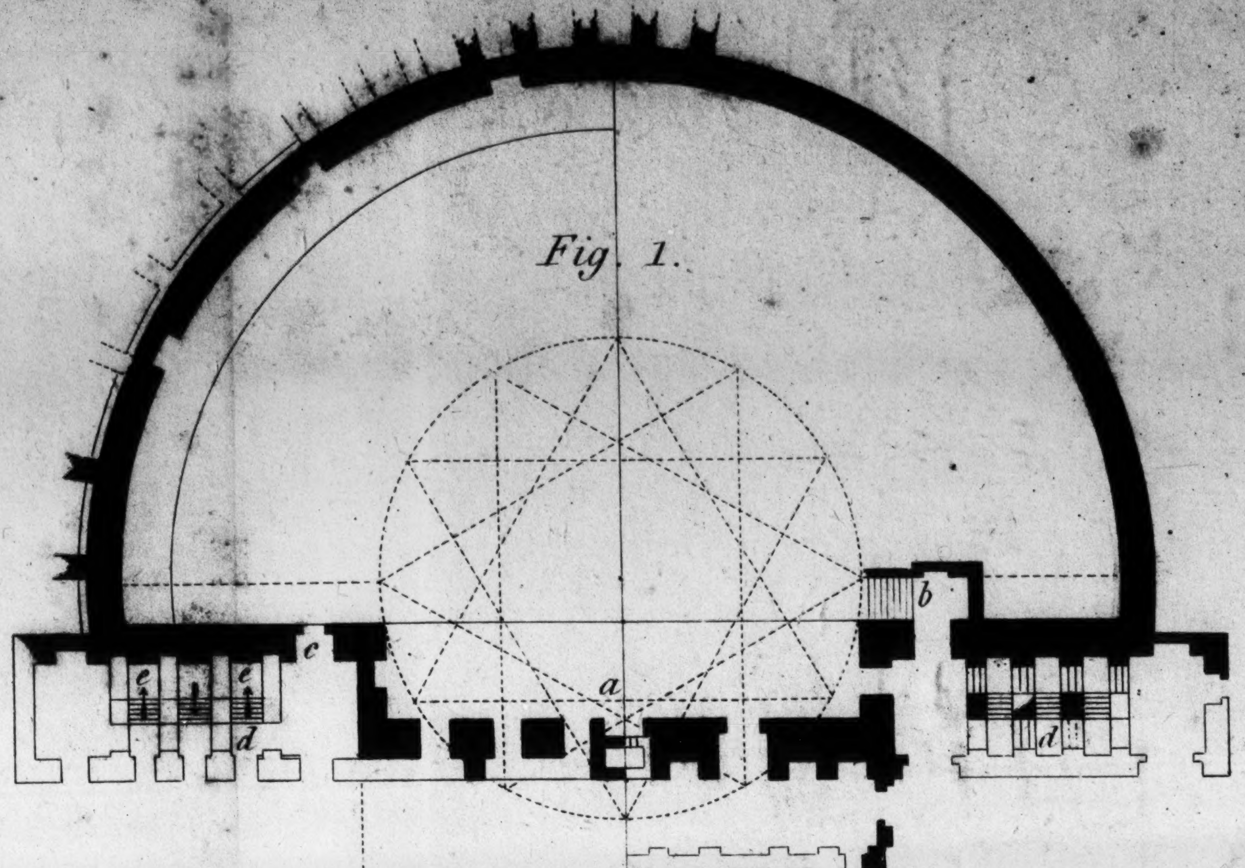


Fig. 1.

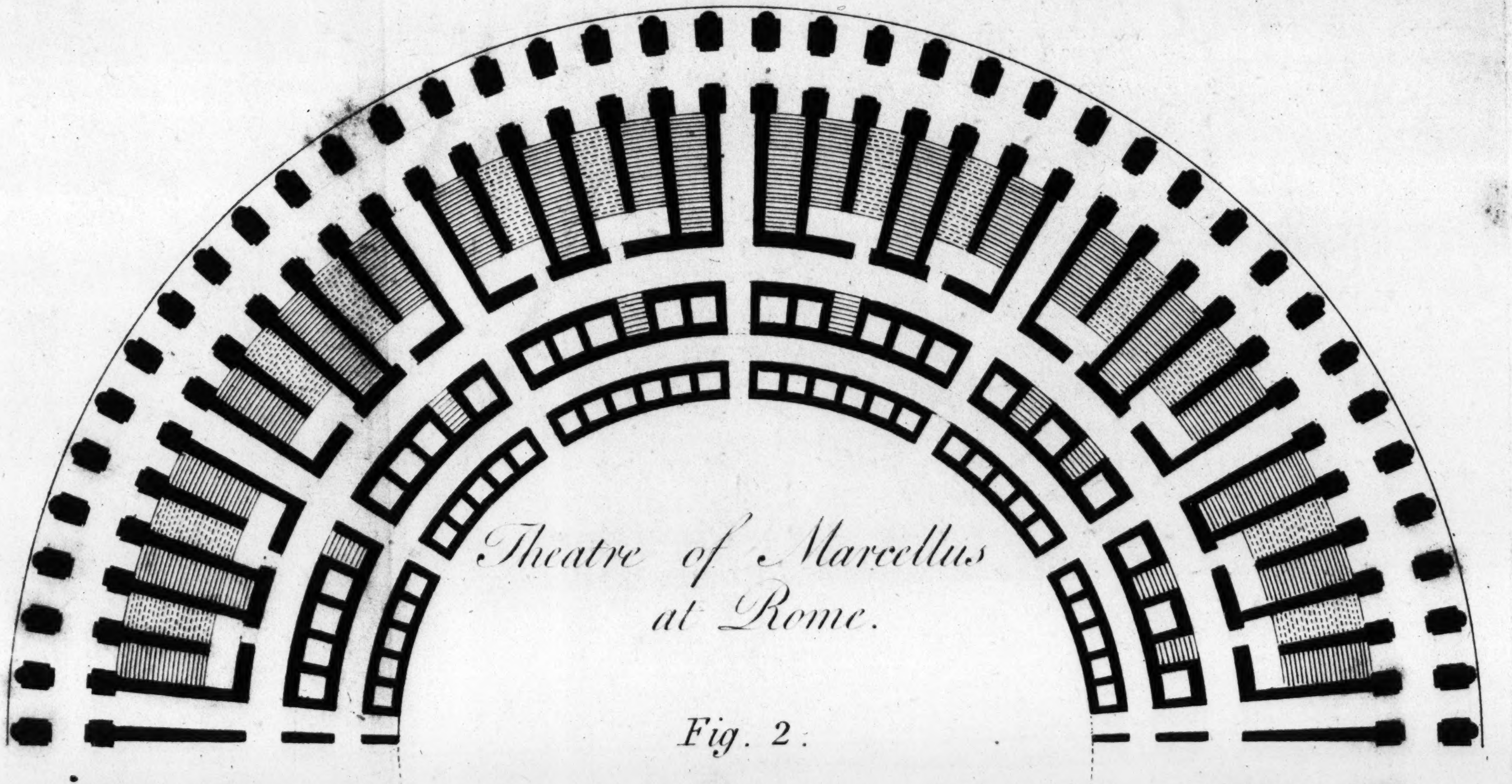


Fig. 2.

References

1. Soldiers Barracks.
2. Porticoes &c. upon t
3. Great Theatre
4. Little ditto _ roofe
5. Temple of Isis
6. Habitations for the
the Temple, with S
7. Other habitations.
8. Xystus for the gy
9. A Temple nearly a
10. Seat for the Scho
11. Habitation withou
12. Wall of Embankm
13. Principal Road l
14. Other Roads desce
15. Modern Road.

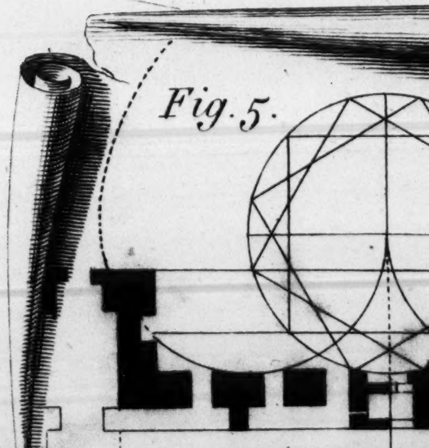
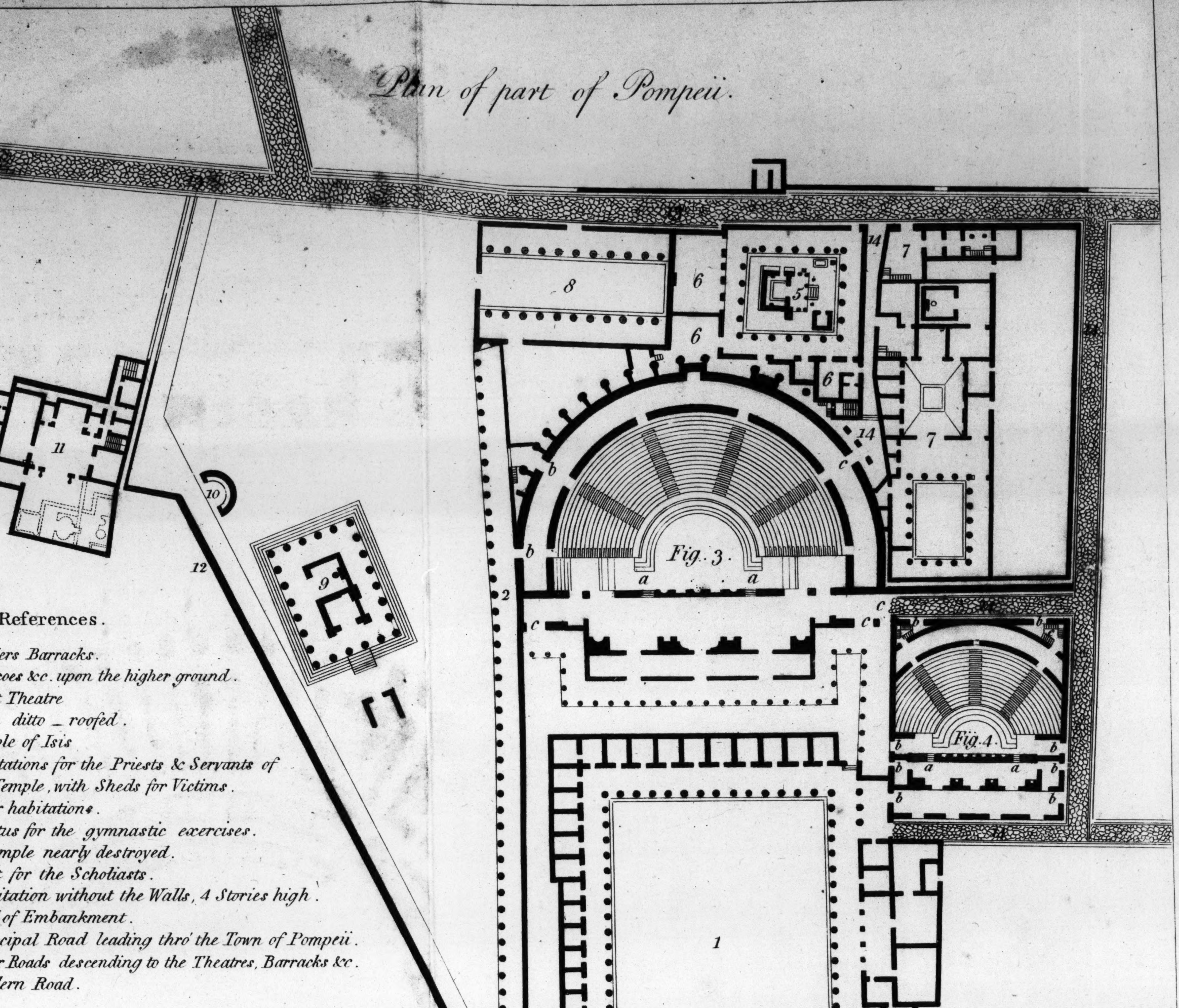


Fig. 5.

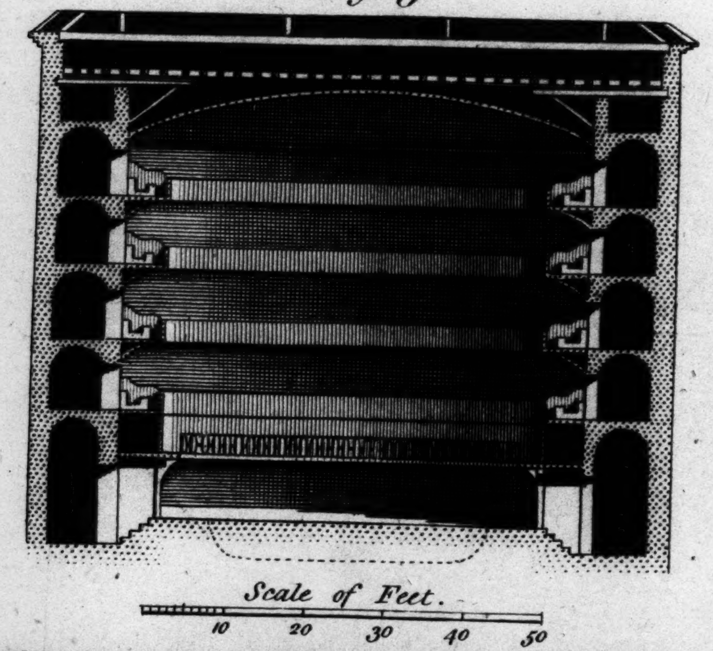
Plan of part of Pompeii.



References.

ers Barracks.
coes &c. upon the higher ground.
Theatre
ditto _ roofed.
ple of Isis
tations for the Priests & Servants of
Temple, with Sheds for Victims.
r habitations.
tus for the gymnastic exercises.
mple nearly destroyed.
t for the Scholiasts.
itation without the Walls, 4 Stories high.
of Embankment.
cipal Road leading thro' the Town of Pompeii.
r Roads descending to the Theatres, Barracks &c.
dern Road.

Plate IV.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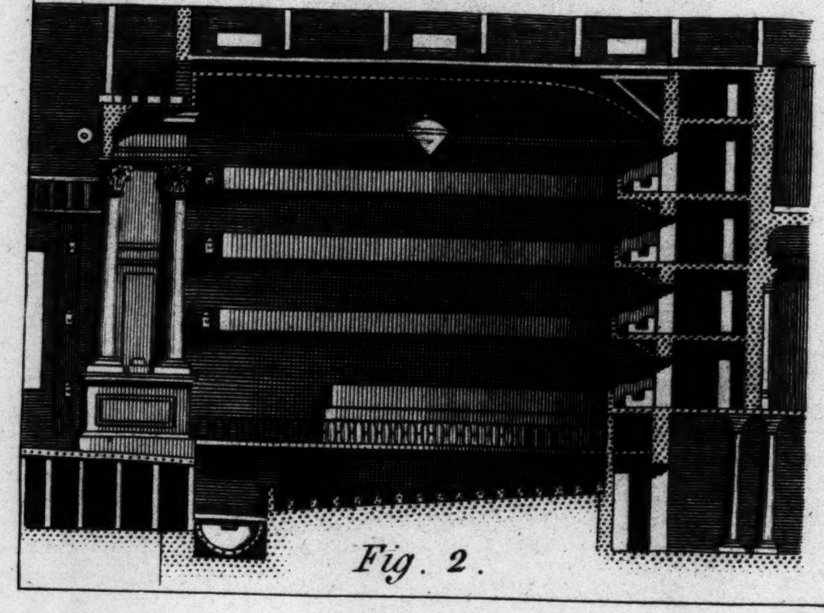
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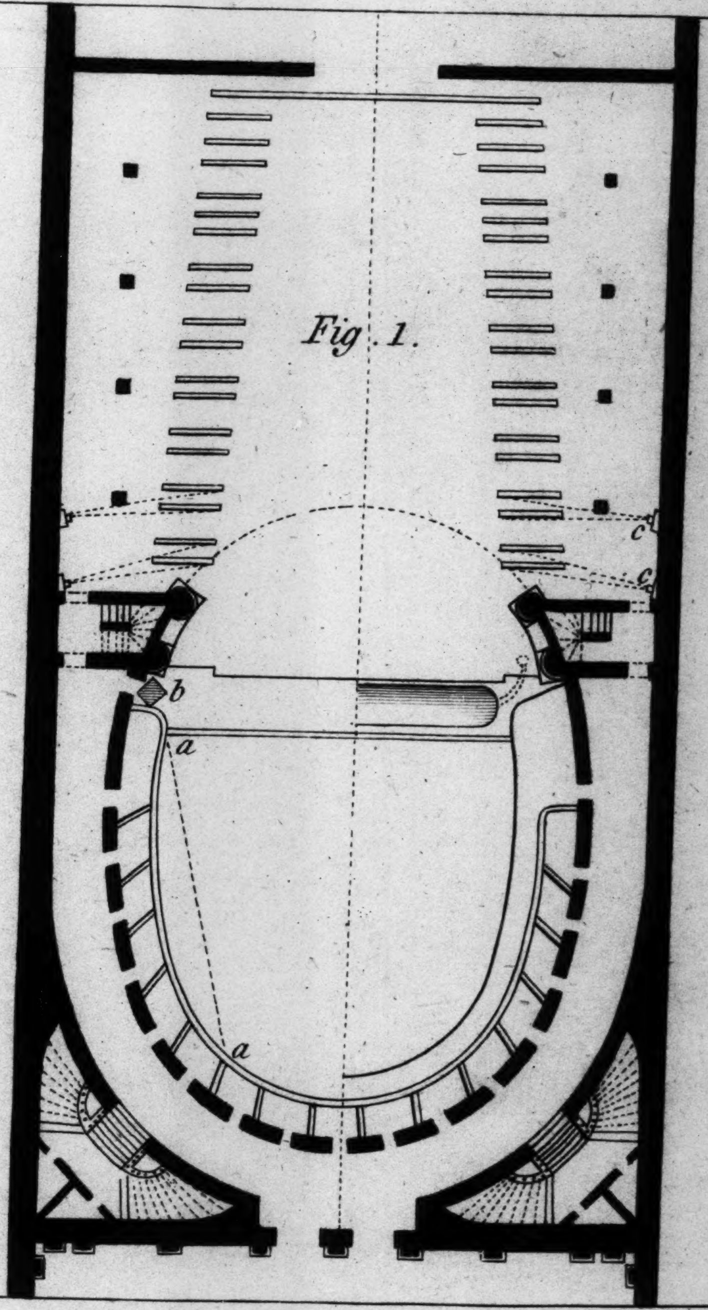


Fig. 1.

Theatre at Vicenza.

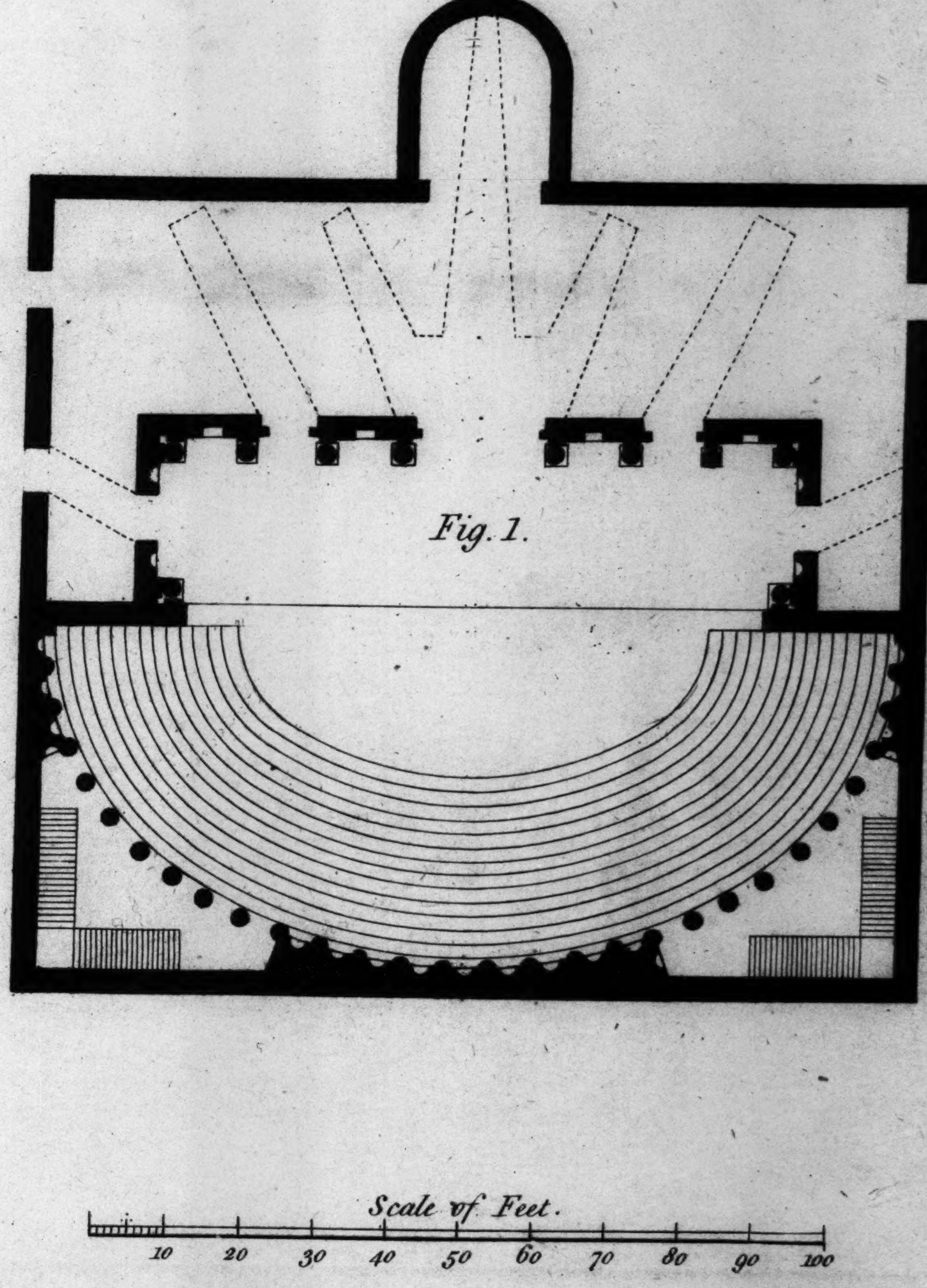


Fig. 1.

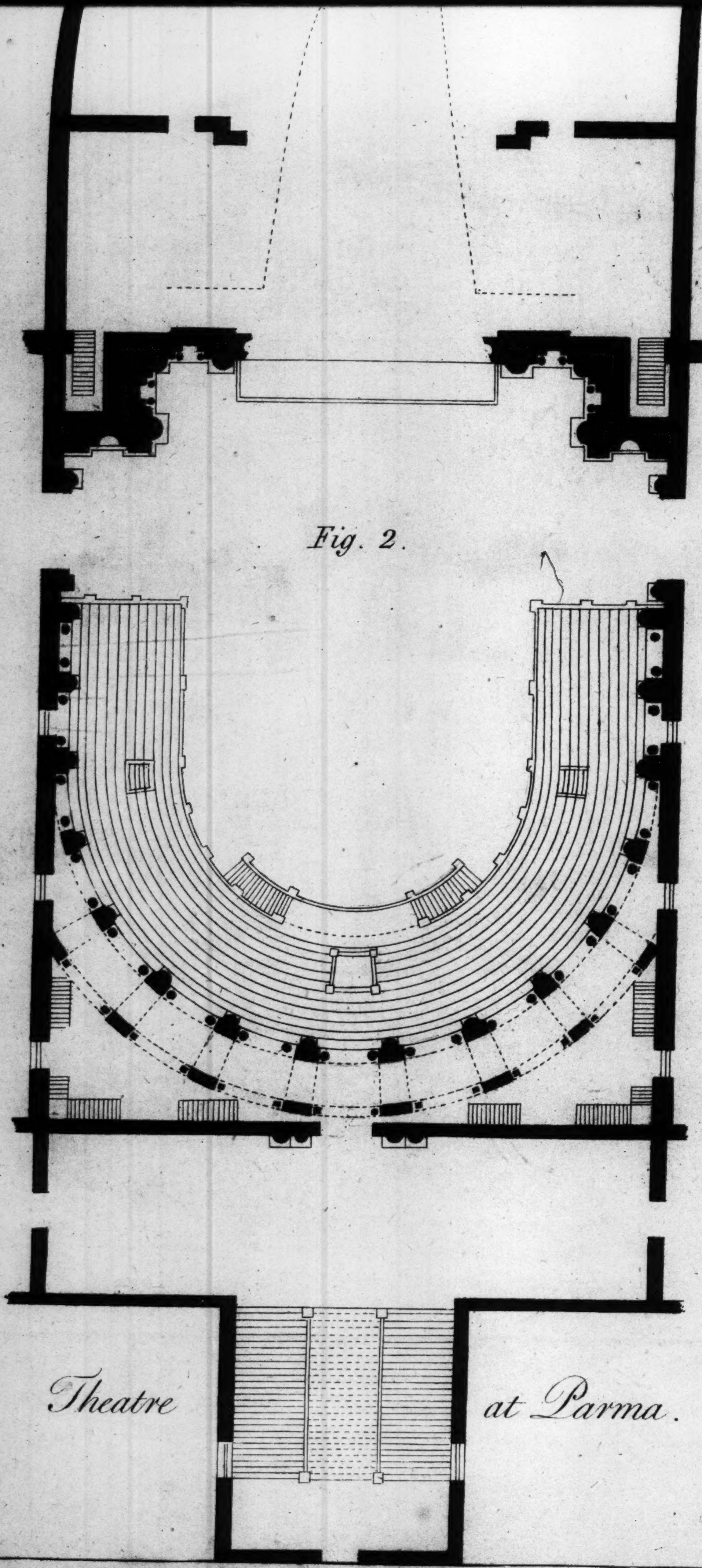


Fig. 2.

Theatre at Parma.

Plate VI.

Theatre at Turin.

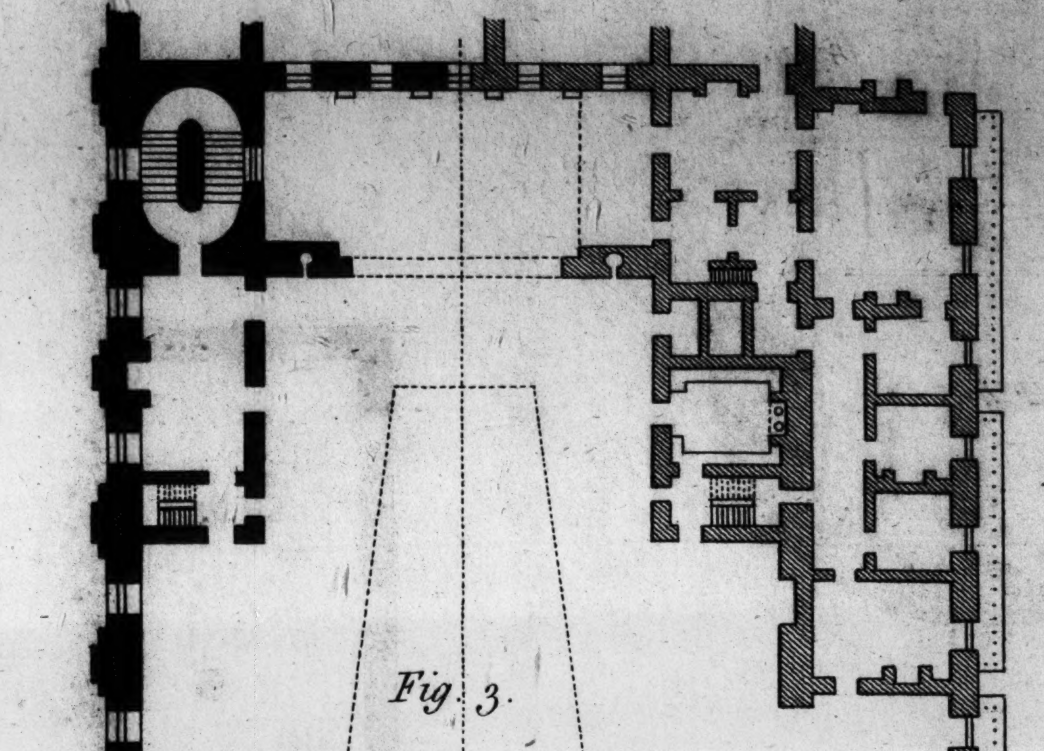


Fig. 3.

Theatre at Boardeaux.

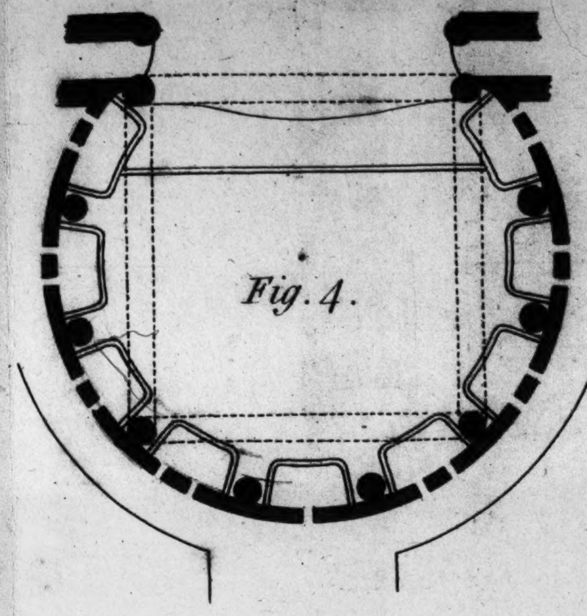
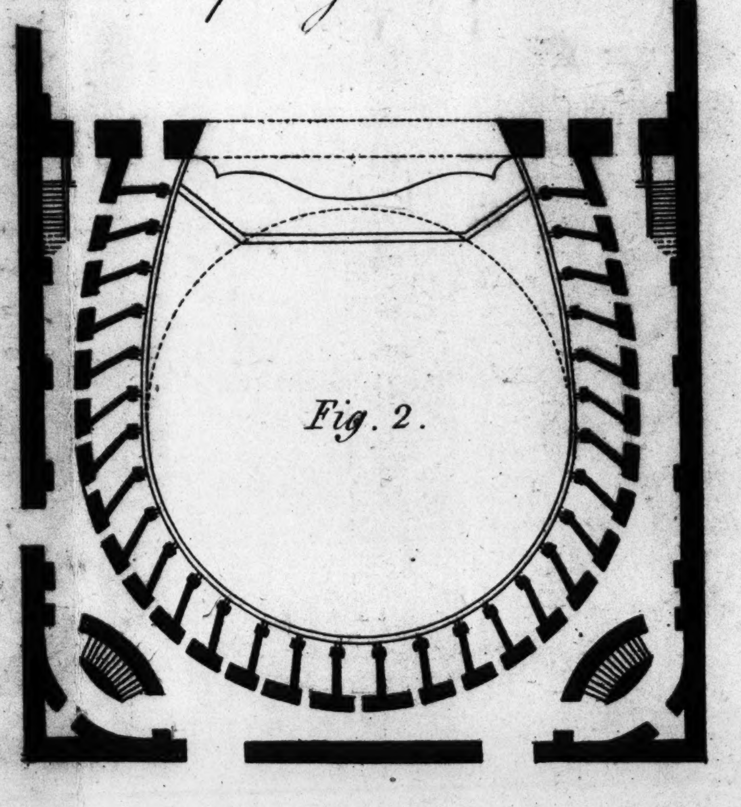


Fig. 4.

Theatre of Argentino at Rome.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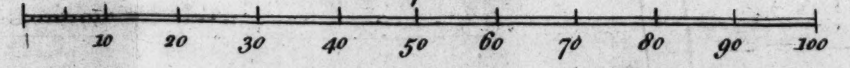

Scale of Feet

Theatre of San Carlo at Naples.

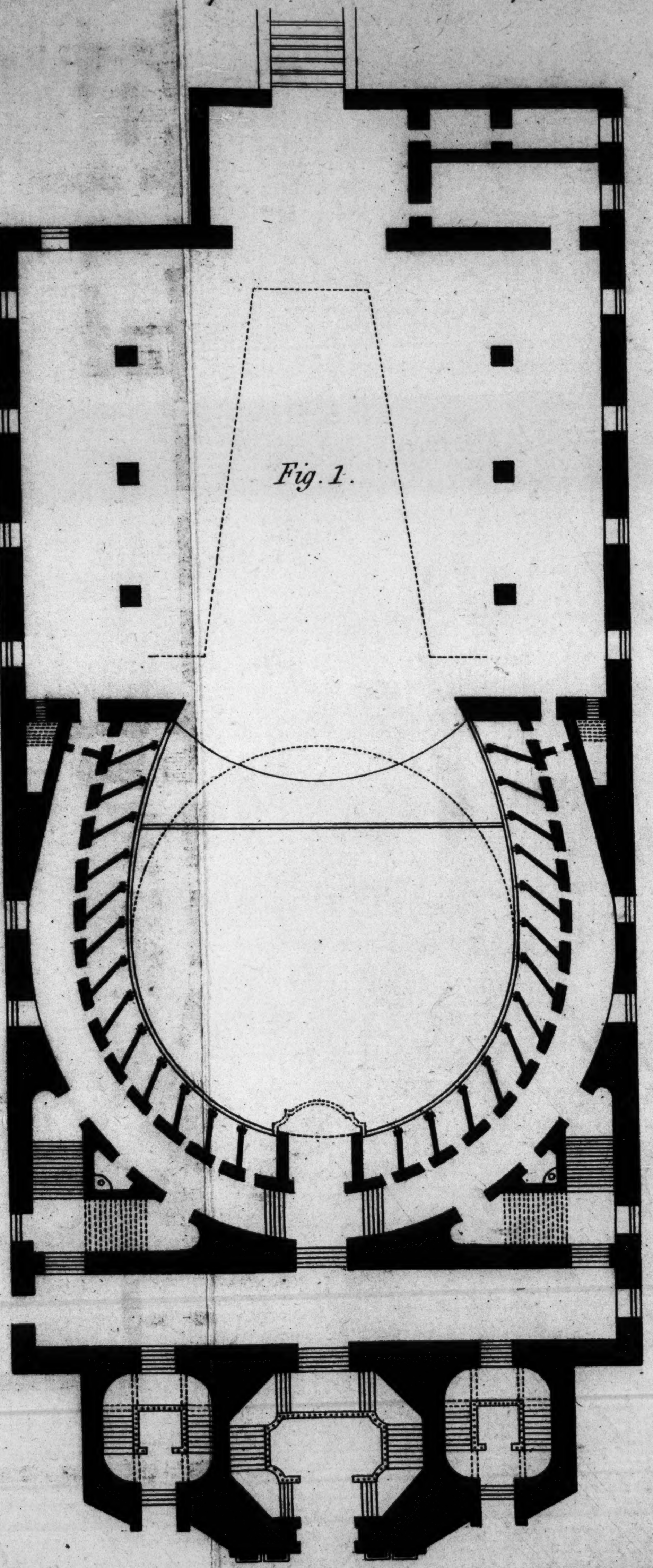
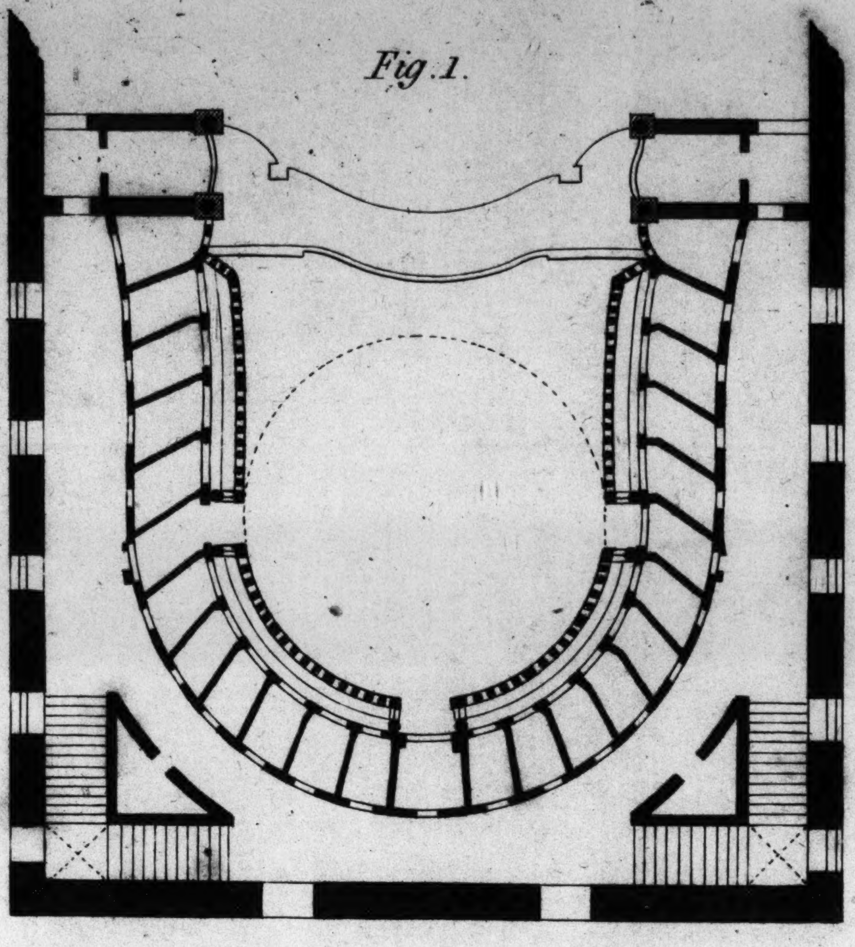


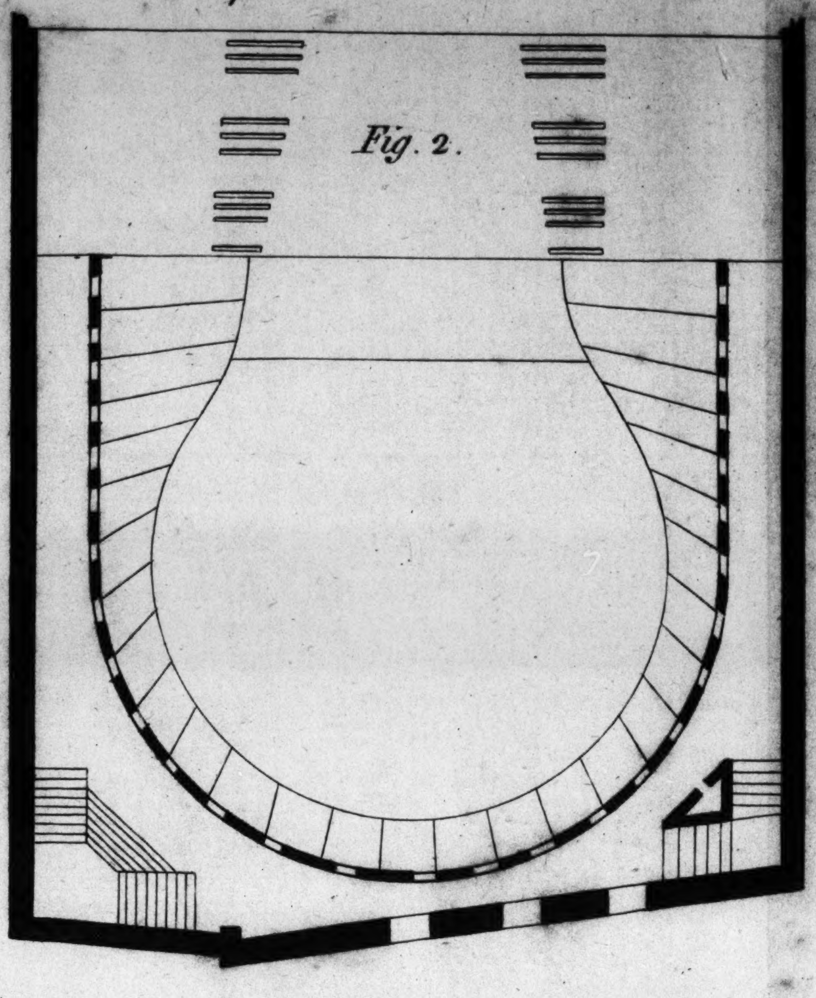
Fig. 1.

Plate VII.

Theatre at Bologna.



Theatre of San Benedetto at Venice.



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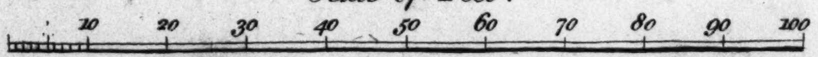
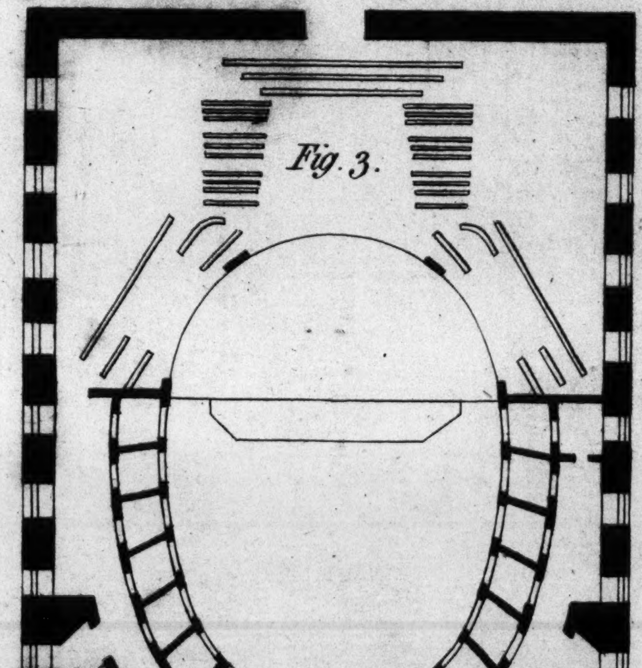


Theatre at Imola.



Theatre at Milan.

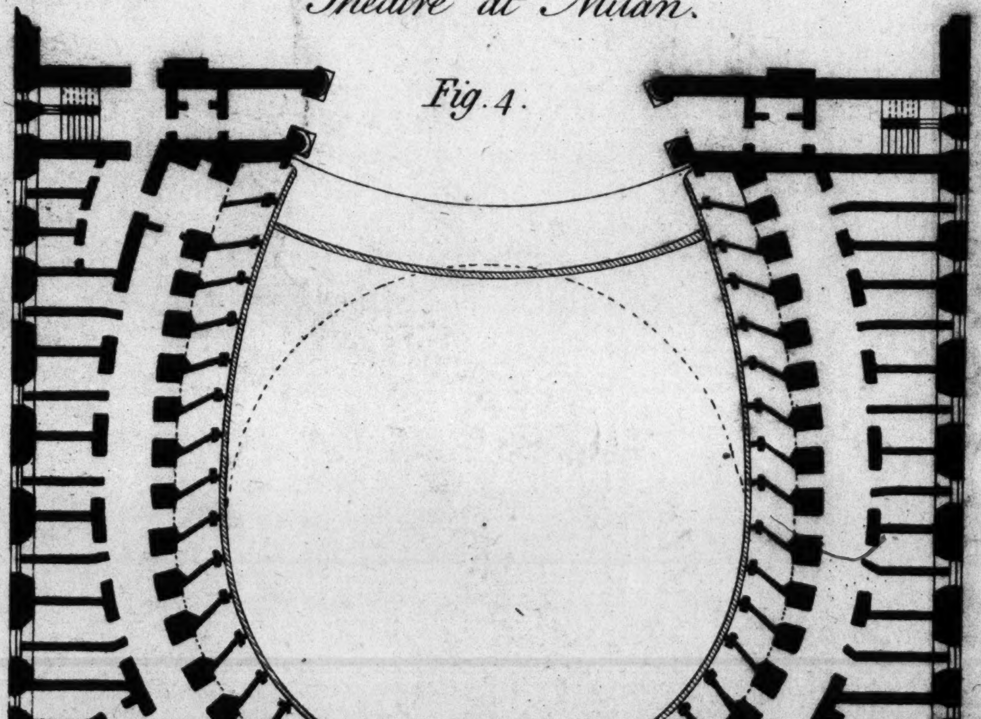
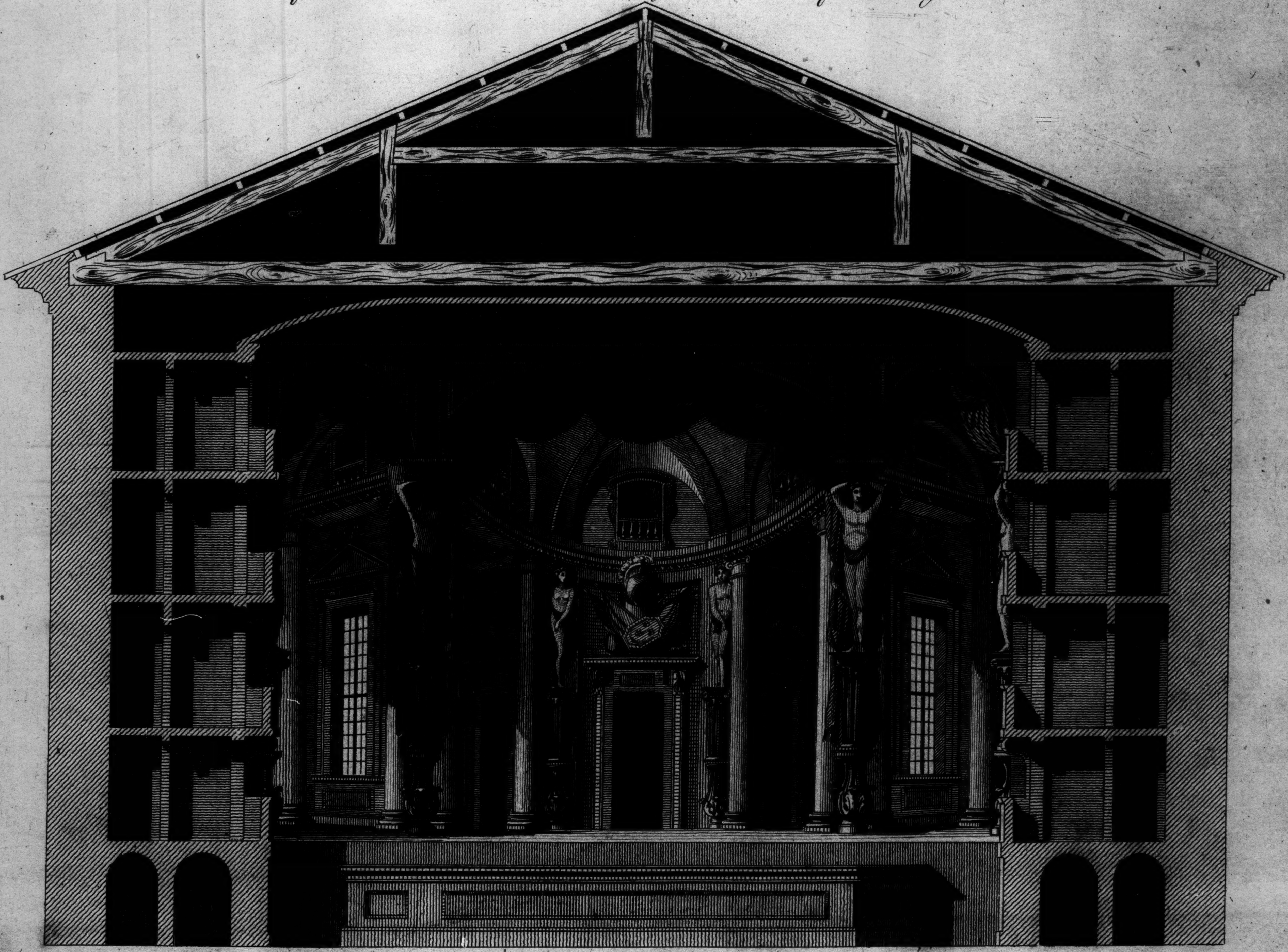


Plate VIII.

Plate VIII.

Section of the Theatre at Imola, shewing the manner of disposing the Scenes.



Théâtre Italien

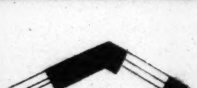


Plate IX.

Théatre Italien
at Paris.

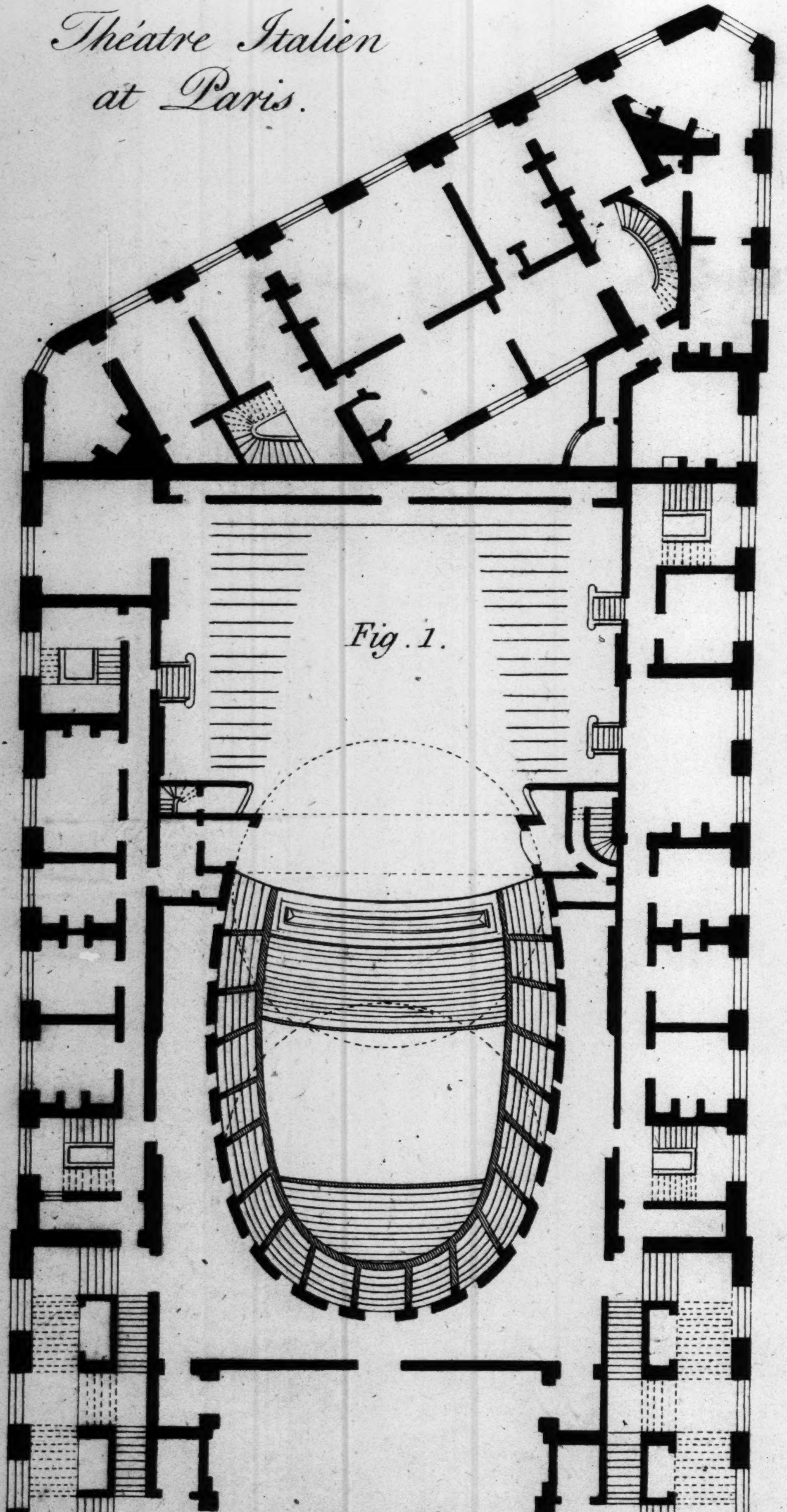
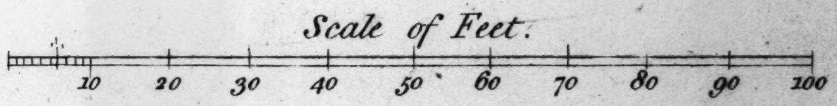


Fig. 1.



Théatre Français at Paris.

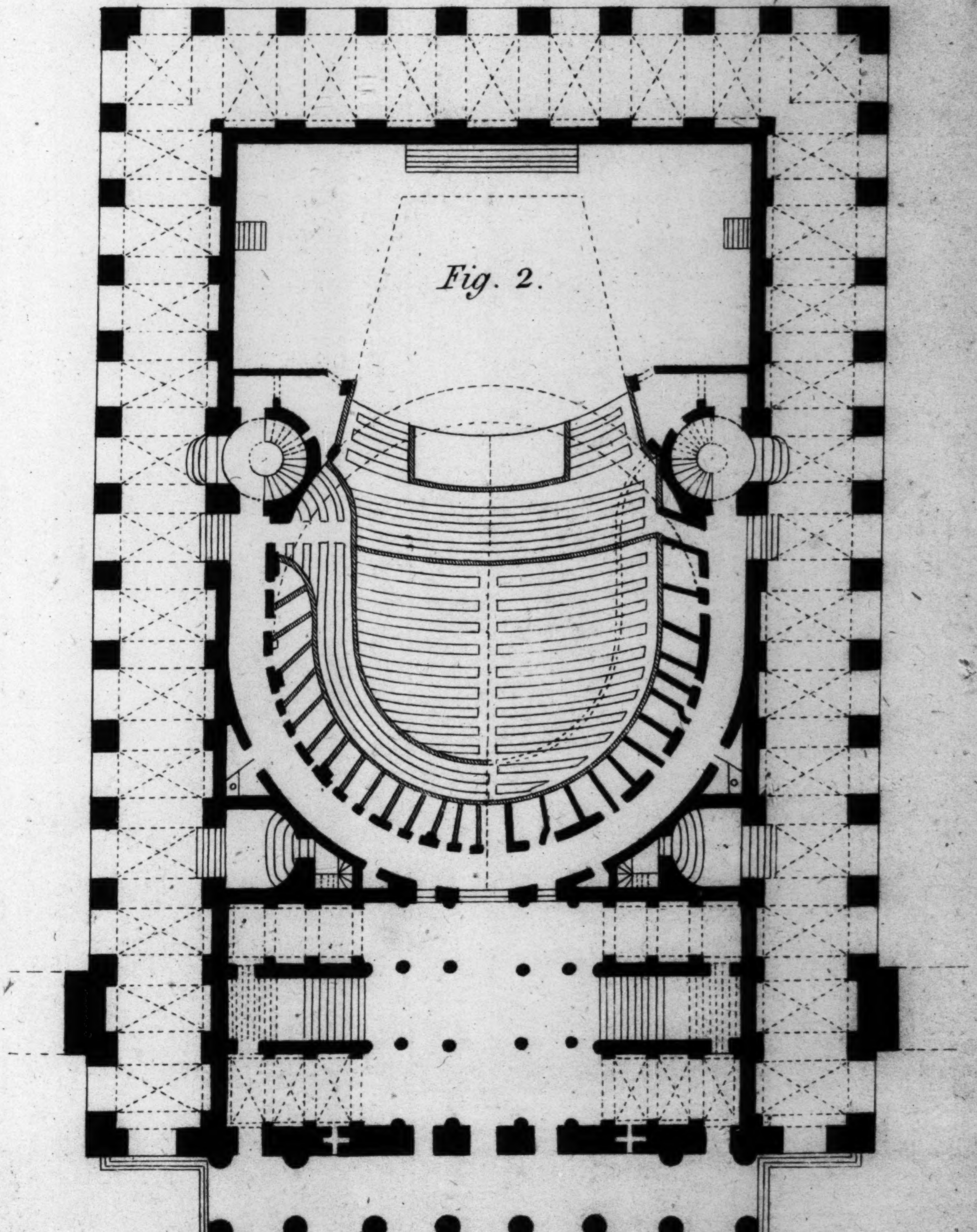
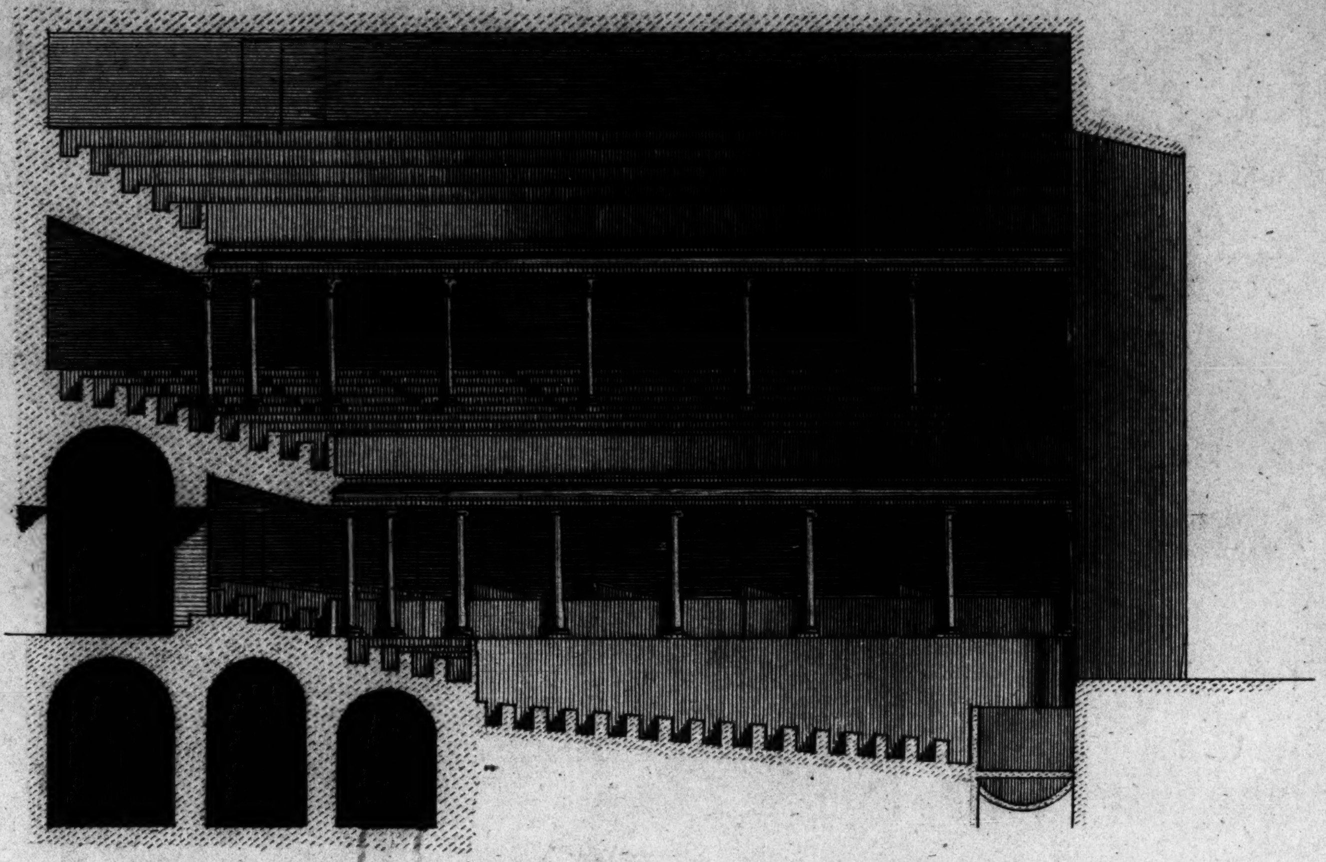


Fig. 2.

Plate XII.

Fig. 1.



Scale of 10 20 30 40 50 Feet.

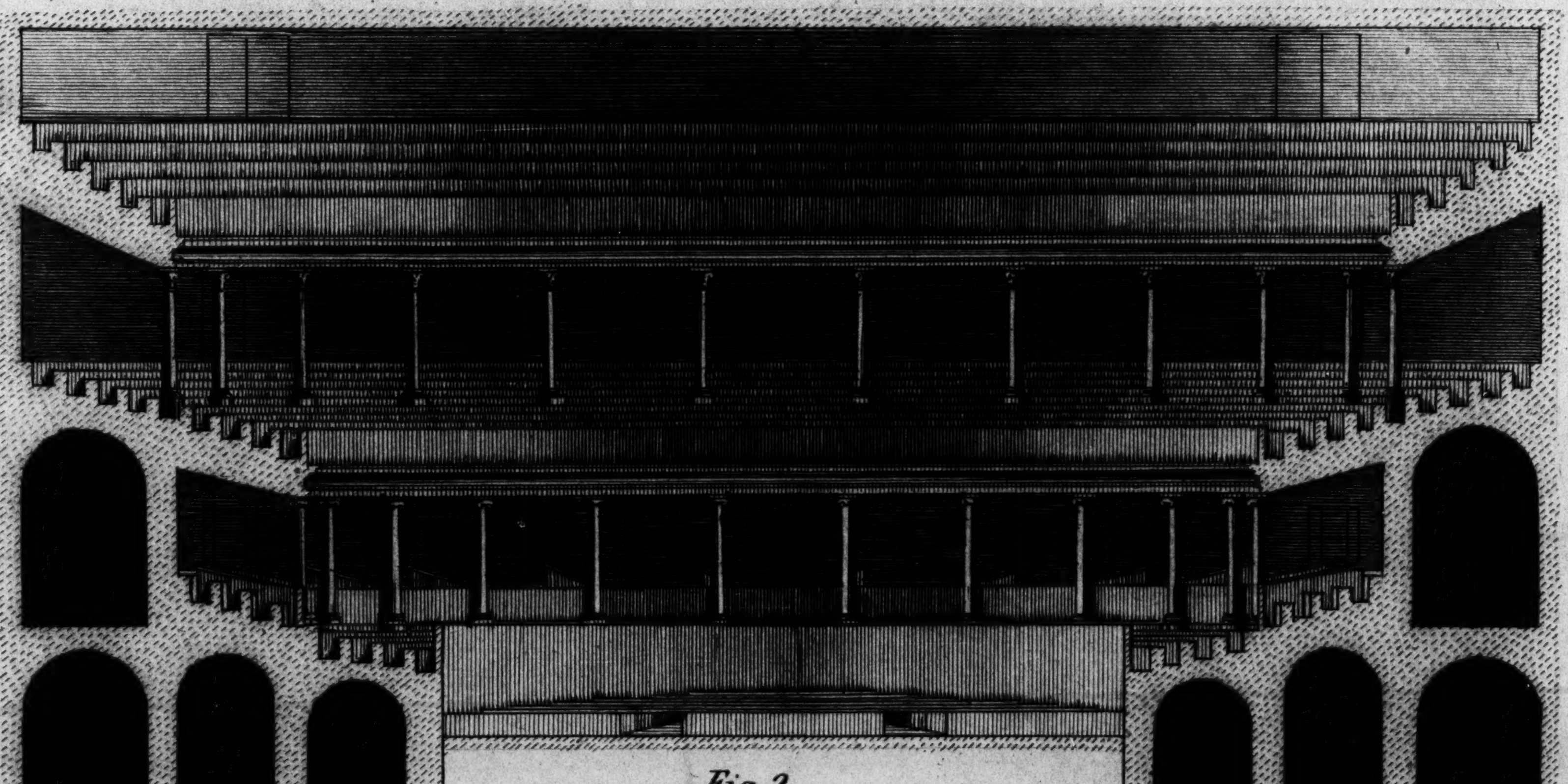


Fig. 2.

G. Saunders inv.t

T. Miller sculp.

Plate. XI

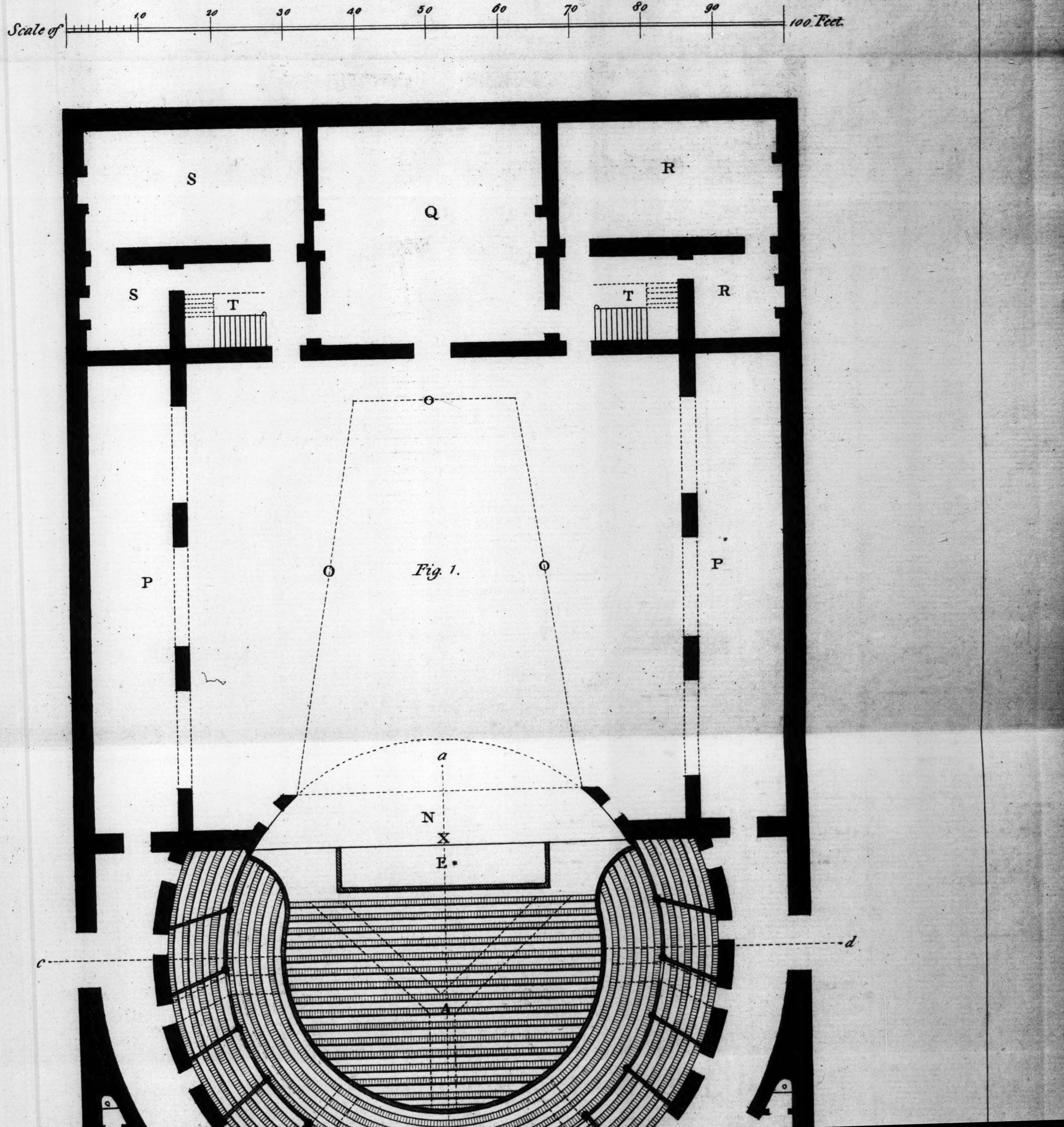
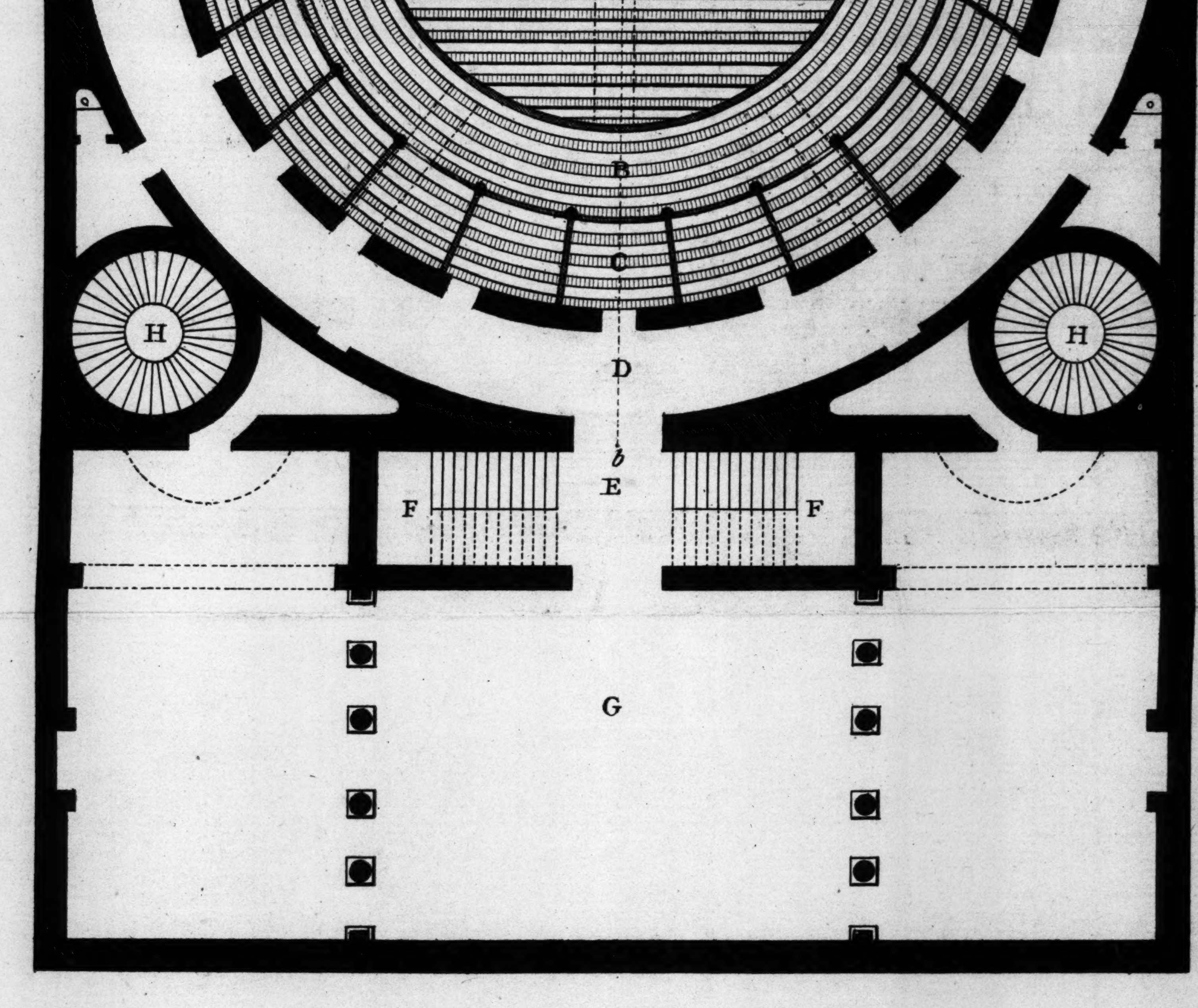


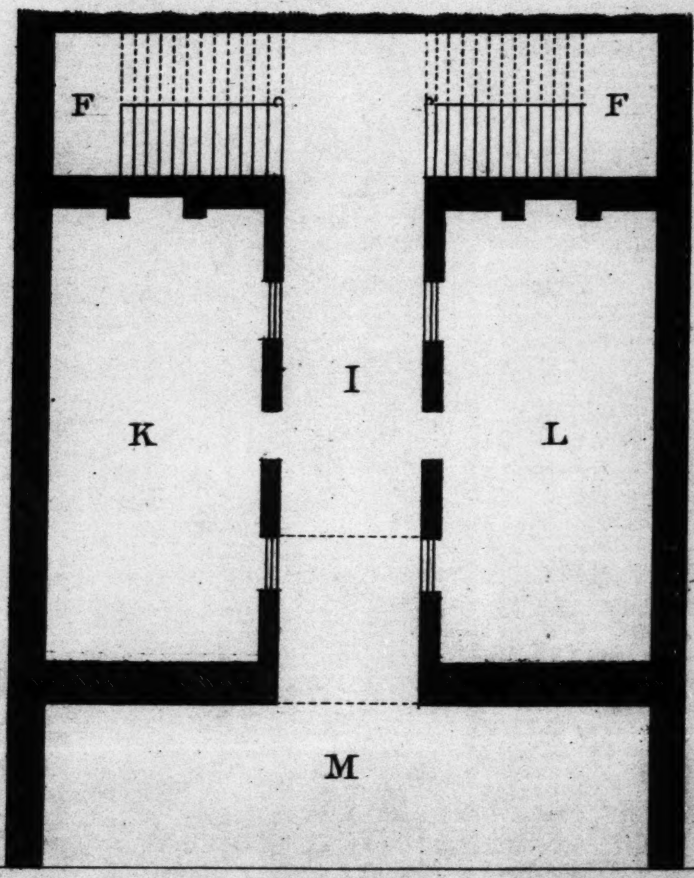
Fig. 1.



Theatre.

A. *Pit*
B. *Balcony*
C. *Boxes*
D. *Coviadore*
E. *Lobby*
F F. *Principal Stair Caſes*
G. *Coffee Room*
H H. *Gallery Stair Caſes*
I. *Entrance under Coffee Room*
K. *Waiting Room*
L. *Receivers Room*
M. *Servant's Hall open to the Street*
E^{o} *Orcheſtre*

Fig. 2.

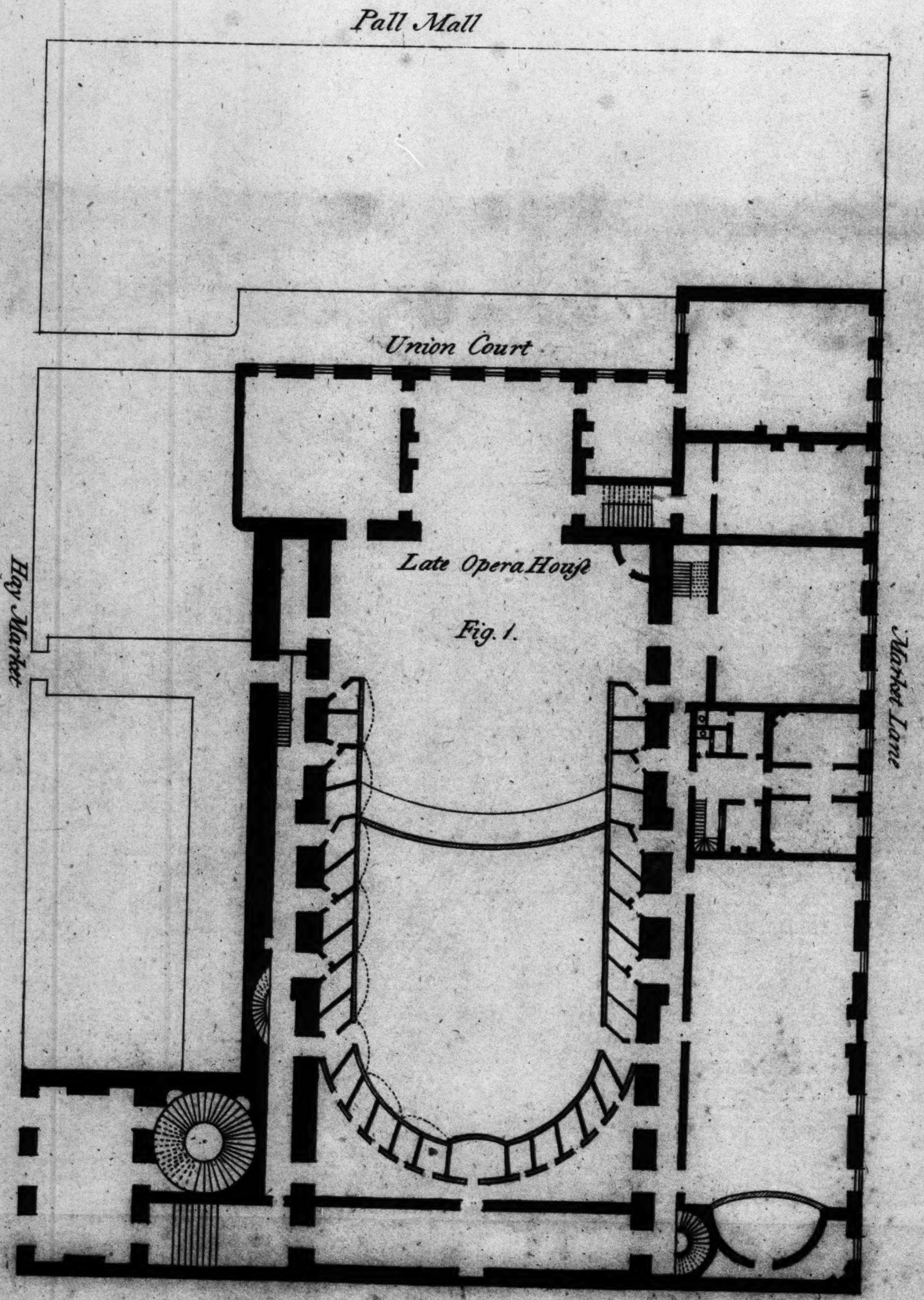


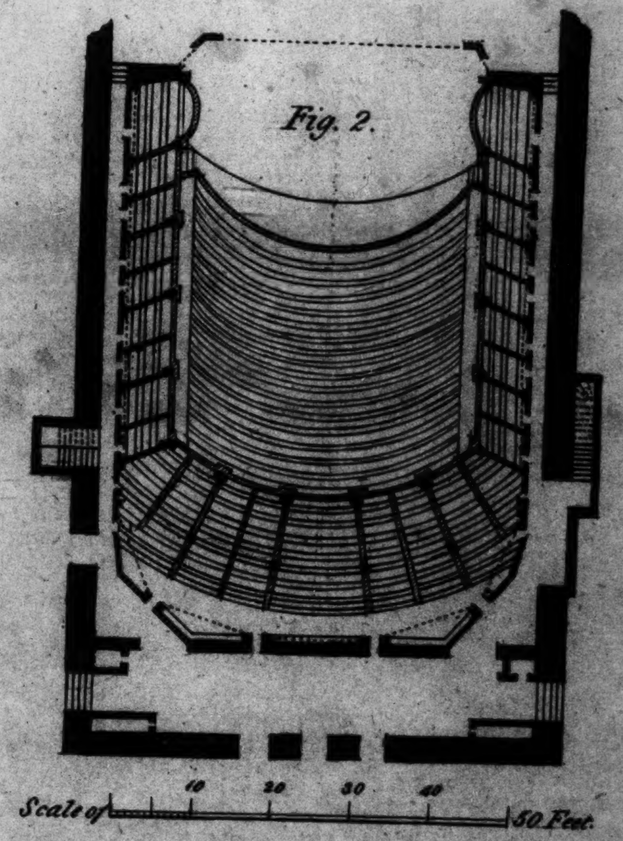
Stage.

N. *Frontiſpiece*
O O. *Scene*
P P. *Depoſitories*
Q. *Green Room & a Wardrobe over two Stories above Stage floor*
R.R. *Women's Dreſſing Rooms four Stories high above Stage floor*
S S. *Men's ditto*
T T. *Stair Caſes*

G. Saunders inv.^t

T. Miller ſculp.





Covent Garden Theatre.

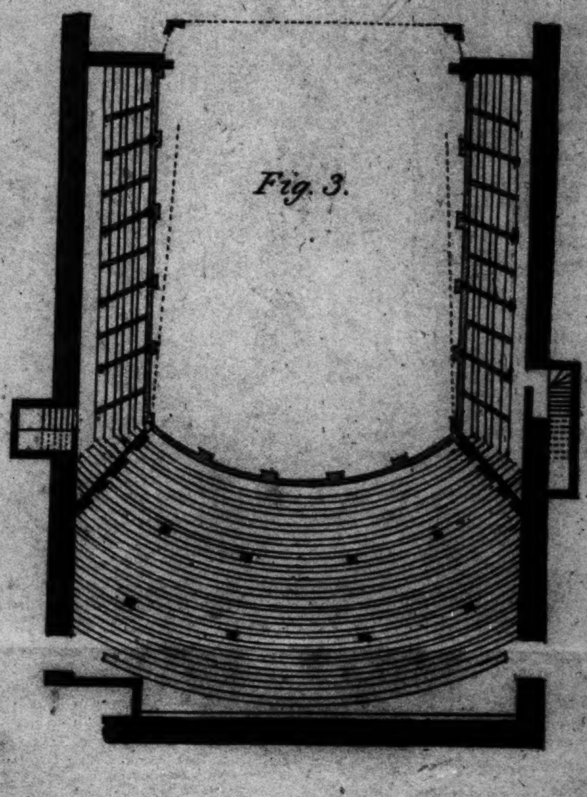


Plate X.

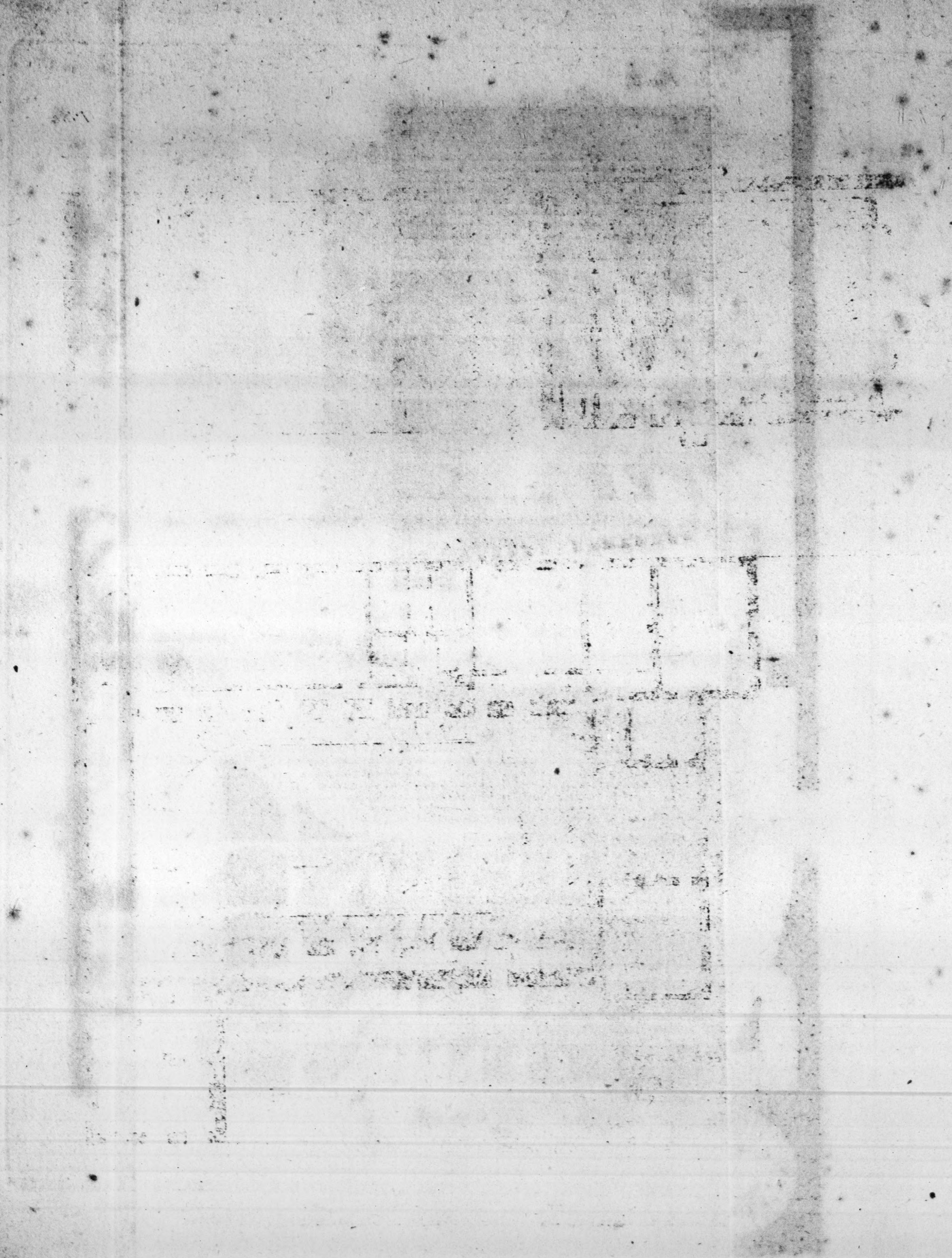
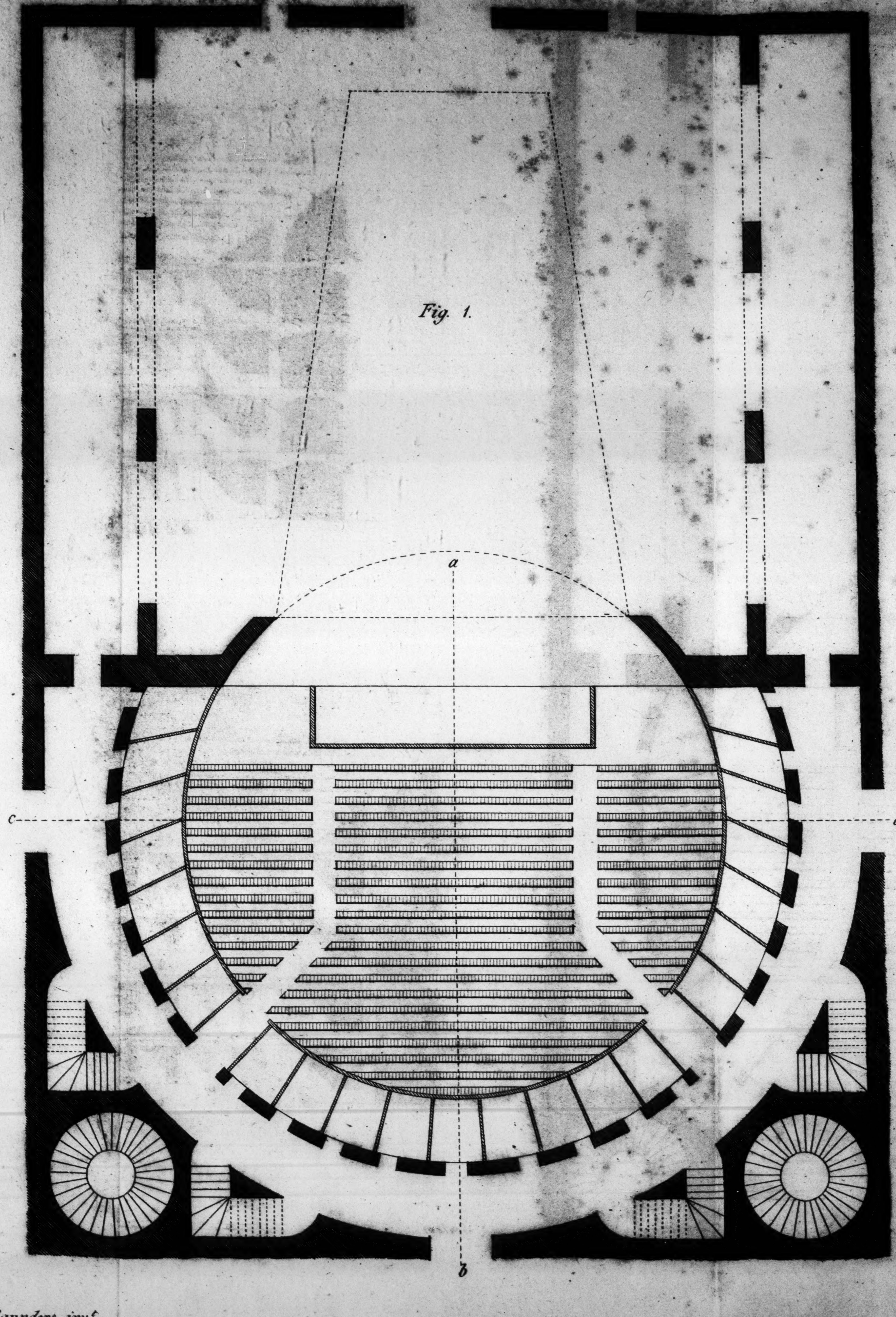


Fig. 1.



Scal

G. Saunders inv.t

Plate XIII.

Fig. 2.

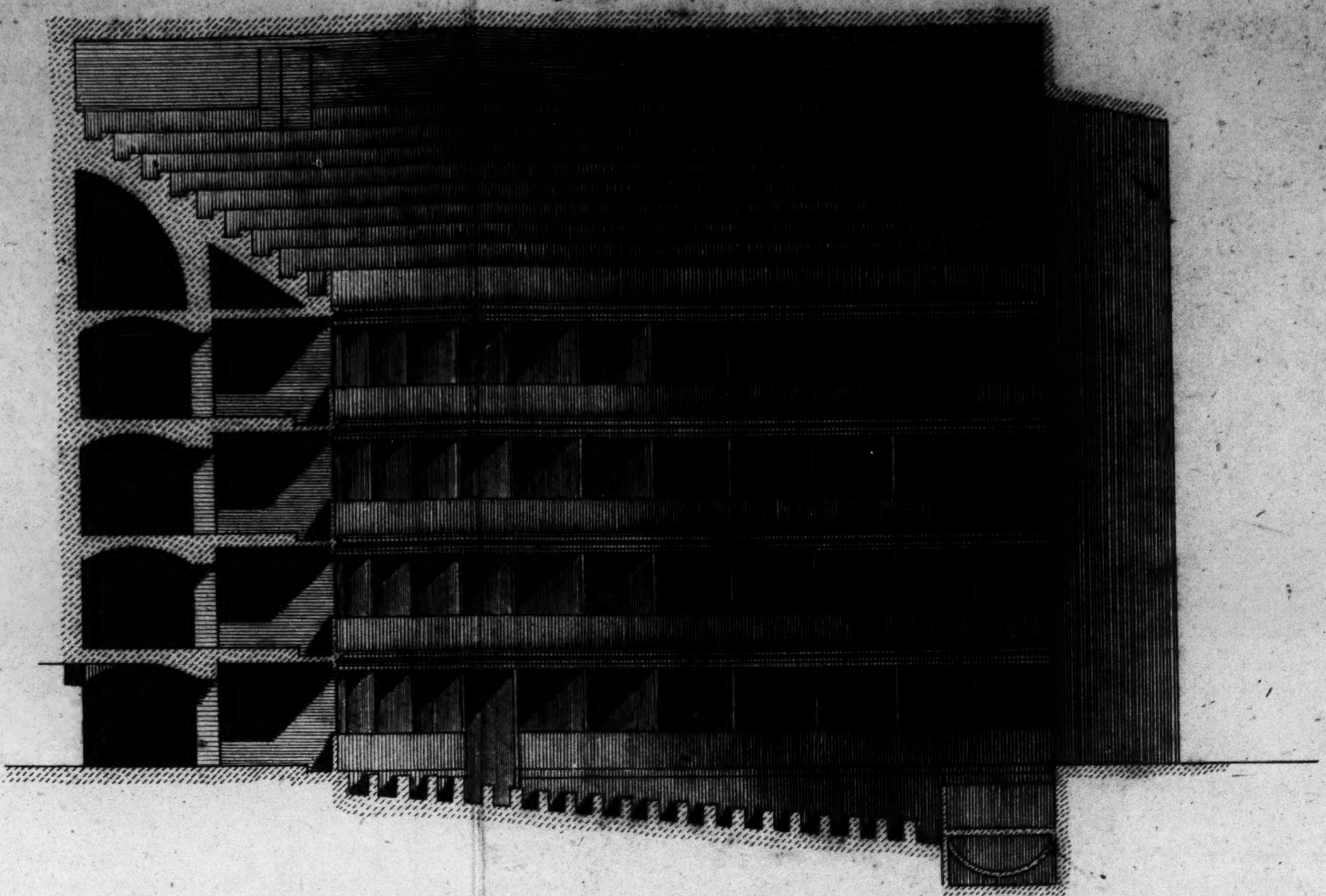
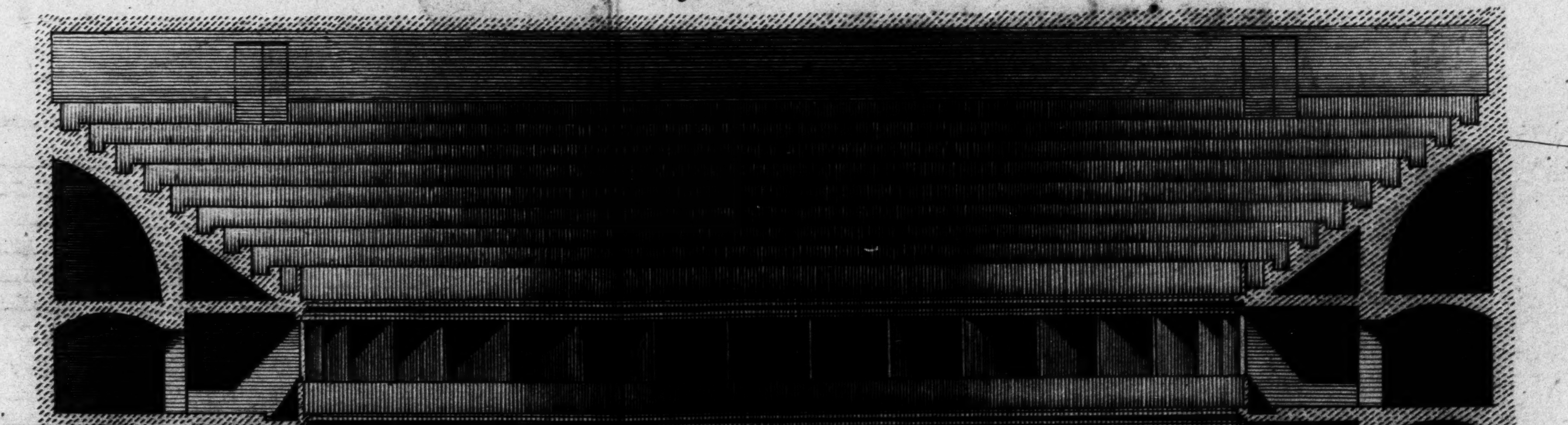


Fig. 3.



Scale of 10 20 30 40 50 60 70 80 90 100 Feet.

T. Miller sculp.